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ELECTRIC POWER

CREATION OF NEW ARMENIAN TETS PROPOSED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 4 Feb 81 p 2

[Article by G. Andreyev, Secretary of the Central Committee of the Communist Party of Armenia: "Stages and Problems of Growth"]

[Excerpt] There is yet another major problem--the development of a fuel power base. According to forecast estimates, the total consumption of electric power in Armenia will grow to 13.6 billion kilowatt hours by the end of 1985. This will put a strain on the Armenian and Transcaucasian power systems. However, the Basic Directions draft does not call for the construction of power capacities for us. Therefore, in our view, the construction of the new Yerevanskaya TETs must be started now in the 11th five-year plan. At the same time this would also improve the centralized heat supply of Yerevan. The task of creating an hydraulic accumulator station to cover the peak loads of the Transcaucasian power system must be completed. The construction of the Akstafa-Yerevan oil product pipeline and a new gas pipeline from gas sources within the country is of no less importance for the further development of the national economy of the republic. It appears that it is advisable to include the tasks for solving these problems in the CC CPSU draft which has been discussed.

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ELECTRIC POWER

CONSTRUCTION OF THE CHIRKEYSKAYA GES

Moscow PRAVDA in Russian 10 Feb 81 p 2

[Article by V. Artemenko: "The Sulakskiy Cascade"]

[Text] Dozens of large and small rivers carry their waters through the valleys of Dagestan to the Caspian Sea from the sparkling icy "papakhas" of the main Caucasian Range. The most ferocious of them is the Sulak. From ancient times people have called the Sulak the "dragon river." Its enormous water power potential had been squandered. It has only been under Soviet rule that people have undertaken the job of taming the Sulak and its tributaries. The first project built was the small Gergebil'skaya GES, and then the Chir"yurtovskaya station. The Chirkeyskaya GES, which was accepted into continuous industrial operation yesterday, is the largest in the Sulakskiy Cascade. Its capacity is one million kilowatts. The hydrostation is intended to cover the peak part of the load schedule of the Northern Caucasus United Power System.

There were many unusual things for the first people here. The station was built in the narrow and almost inaccessible Chirkeyskiy Gorge. The slopes were almost vertical, with a depth of more than 200 meters and a width in the lower part of 12-15 meters. We had to span the canyon with a gigantic concrete screen, and erect an arched dam as high as an 80-story skyscraper. Several kilometers of tunnels had to be punched through rocks in order to go out to the line of the future dam.

The Caucasus kept on surprising us. The GES was built in a high seismicity area. The soil here caused much trouble--it consisted of dry limestone. The frosts bothered the people in the winter during the beyond-the-cloud watches and in the summer 50-degree heat burned.

"Considering the special complexity of the construction project," the manager of Dagenergo [Dagestan Regional Power Administration] V. Muslimov relates, "additional measures were taken. The entire country built the GES."

When they began work, a shortage of specialists--engineers, technicians, highly-qualified construction workers--was sharply felt in the republic. At the call of the party and the Komsomol, ambassadors from almost all of the republics, krays, and oblasts came to Dagestan from the industrial centers of the country. Many had experience in erecting large hydraulic developments--Krasnoyarskiy, Bratskiy, Bukhtarminskiy, Kuybyshevskiy. Builders of the Moscow subway and the Abakan-Tayshet route came.

"On the banks of the Sulak an international laboring family formed in the joint work and became stronger," the brigade leader of SMU [Construction Installation Directorate]-3 of Chirkeygesstroy [Chirkeyskiy Administration for the Construction of Hydroelectric Power Stations] Hero of Socialist Labor M. Gereyev recalls. "More than 3,000 workers and technicians from the various nationalities of Dagestan were trained during the construction of the dam. Now representatives of more than 50 peoples and nationalities of our country are in the collective."

The first difficulty which the tamers of the Sulak encountered was the digging up of rocks, the preparation of the dam's foundation. The gorge is narrow. We were faced with the task of dumping more than two million cubic meters of excavated rocks from both shores. The banks of the Sulak have overhangs like sheer precipices. A cut was made in the dam from above and the rocks were blasted by the so-called smooth splitting-off method. In the first years the Chirkeyskiy workers already achieved high productivity in laying concrete in the dam. Many new machines and devices were used.

In the days of "big concrete" the absence of people startled all who visited the construction site at the high dam. A total of two people worked in the blocks--one directed the trough, and the other commanded a machine on which four vibrators were mounted. Soon afterwards only one person remained in each block. An automatic electronic machine, which did the assigned concrete packing, replaced every second person.

Day after day, year after year, the builders erected the more than 200-meter high concrete arch dam, the GES building with the dual arrangement of hydraulic machinery, a 330,000 volt open power switchboard, and the protective Tishiklinskaya earth dike with spillway.

At the Chirkeyskaya GES the machines have not been installed in parallel, as is the usual way, but successively. Suction pipes have been installed in pairs, one after another in two stages. An automatic operator runs the station.

Now there is silence at the GES. The builders have left. The machines buzz evenly and powerfully in the turbine room. The chief engineer of the GES Z. Zelenovskiy relates that since the first machine was started up, the Chirkeyskaya GES has generated 11 billion kilowatt hours. The GES has already repaid 70 percent of the capital investments.

The Sulak provides not only electricity. The Chirkeyskiy hydraulic development is of great importance in raising the economy, culture, and well-being of the toilers of Dagestan. It permits a total solution to the problems of energy, irrigation, and the water supply of the cities and settlements of the republic. The construction of the 75-kilometer irrigation canal imeni Oktyabr'skaya Revolyutsiya was recently completed. Sulak water travels to Makhachkala, Kaspiysk, Buynaksk, Kizilyurt, and other cities and villages of the republic along this artery from the Chirkeyskiy and Chir"yurtovskiy reservoirs. In light of the input of the Chirkeyskiy "Sea," fundamental changes have been introduced into the Yuzbashaksayevskaya irrigation system. The Verkhne-Khasavyurtovskiy canal has been built from the GES, and the Alikhan canal begins in the reservoir's water area. Now 288,000 hectares of arid land are being irrigated in this mountainous region.

In addition to the GES, the hydraulic builders are constructing industrial enterprises, cultural and personal projects, and housing in the republic's cities and villages. The iron foundry at the Kizilyurtovskiy Printing Machinery Plant, the Ekibulak-Dubki gas pipeline, a House of Culture, a sports complex, and housing are all under construction.

In the remote highly-mountainous village of Chirkat, the director of the local cannery M. Gadzhiyev happily shares the following with me:

"Our enterprise was cramped. We asked Chirkeygesstroy for help and, although the administration is far from us and it is not easy to transport heavy loads to us over the mountain roads, they nevertheless started to build a new, large production wing."

After Chirkey the builders directed their main energies toward two new power projects. They are erecting the Miatlinskaya and Irganayskaya GES's in the gorges of the very same Sulak.

Nature is once again bringing surprises to the designers and builders. At the very height of the preparatory work the mountain opposite the future arched high dam suddenly moved. A "small bit" of rock, 1.8 million cubic meters in volume, moved 40 meters.

It had to be re-formed on the move. The decision was made to restore the mountain. About 700,000 cubic meters of loose soil were taken out of it and the same amount of firm materials were packed in it. A large amount of work was carried out in a short period of time under difficult geological conditions in a tight area. Measures were taken to prevent a subsequent landslide.

"The collectives which are responsible for the Miatlinskaya GES fulfilled the 1979 plan by 166 percent and in the past they dammed the Sulak ahead-of-schedule," announced the secretary of the Chirkeyskaya GES party committee M. Magomerkhanov.

It is written in the CC CPSU draft for the 25th Party Congress: "Begin the construction of the Irganayskaya GES." A transportation tunnel is already being built which will open a short route to the station area. Powerful equipment has arrived on site. A temporary settlement and a river crossing are being erected. A participant in the construction of three electric power stations of the Sulakskiy Cascade, now the chief of SMU-3 M. Atayev, is directing operations.

The mastery of the Sulak and its tributaries is continuing. In 1983-84 it was decided to put all of the hydraulic machinery of the 220,000-kilowatt Miatlinskaya GES into operation, four machines with a total capacity of 800,000 kilowatts are planned for start-up at the Irganayskaya station in the 12th five-year plan. The further development of the water power of Dagestan is linked to the utilization of the resources of the tributaries of the Sulak and the Samur River.

Rich work experience has been gained on the mountain rivers and very good specialists have been trained. Nevertheless the Chirkeygesstroy administration is not working at full strength at the present time. First of all, production disorders are hampering the builders. The inner reserves for increasing the tempo and quality of work must be more fully utilized in the Chirgeygesstroy subunits. The unsatisfactory supply of materials is complicating the situation. Equipment is lacking.

The Chirkeyskiy administration of the all-union association Gidrospetsstroy /State All-Union Trust for the Reinforcement of Foundations and Structures of the Main Administration for the Construction and Installation of Hydroelectric Power Plants in the Central and Southern Regions/ has the very same troubles--it lacks personnel and mechanisms, and mine-sinking equipment.

Housing problems are also troubling the hydraulic builders. In the present five-year plan they have to acquire almost three times as many capital investments for the Miatlinskaya GES than in the previous one. In order to complete this task, it is necessary to increase the total number of those working at the project in the peak year of 1983 to 3,700 persons. They are presently housing less than half this number. In 1983 the housing shortage will amount to 150,000 square meters. The only way out of this is to provide housing quickly. To do this, it is necessary to begin the construction of large-panel buildings in the city of Kizilyurt.

The Basic Directions draft says: "Continue the master of the water power resources of the Northern Caucasus." This means that Minenergo /Ministry of Power/ USSR should intensify its attention to the utilization of the rich resources of the rivers here. PRAVDA as long ago as 1978 wrote about the necessity of speeding up the work on the Miatlinskaya and Irganayskaya GES's. Unfortunately the industry staff has still not achieved a basic improvement in this matter.

In a letter to the communists of Azerbaijan, Georgia, Armenia, Dagestan, the Gorskaya republic, V. I. Lenin in his time advised an immediate start of large-scale electrification work. A power base has now been created in Dagestan whose capacity exceeds the pre-revolution level by more than a thousand times, and the production of electric power by 760 times. The republic has outstripped all of the countries of the Asiatic mainland and many countries of Western Europe in the per capita production of electric power. It is necessary to utilize even more fully the available potential and to build up the power capacities.

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ELECTRIC POWER

NEW USES OF SOLAR POWER

Moscow VOZDUSHNYY TRANSPORT 19 Feb 81 p 4

[Article by V. Shitov: "The Sun is in the Hands of the Scientists"]

[Text] The 20th century is the century for the start of the industrial utilization of new types of power resources. Thanks to the research of scientists, the use of renewable power sources--hydraulic, solar, wind, geothermal--has become practicable. An increase in the use of these types of power will be one of the most urgent tasks in the 11th five-year plan as the CC CPSU draft for the 26th Party Congress stresses.

Candidate of Chemical Sciences A. Kokorin, Scientific Secretary of the Scientific Council of the USSR Academy of Sciences for the over-all question "Finding New Ways to Use Solar Power," talks with our correspondent about the scientific search for new ways to convert solar energy:

"The sun has been warming the earth with its heat and giving life to all those living on our planet for billions of years. Now the time has come for people to begin using solar power for their own needs.

Many feel that the industrial use of solar energy in our country is only possible in Central Asia and in the Transcaucasian republics. In other words, it is possible only there where the sun shines especially brightly and gives off a large amount of heat. However, scientists have calculated that even in the central region of the USSR the sun yields as much energy each year on nine square kilometers of land as a million-kilowatt electric power station produces. It should also be added that solar energy is ecologically clean. There are no harmful wastes--combustion product discharges--from using it. This is why the development of solar energy conversion methods is so urgent today.

Scientists are solving a complex task--which is the most effective of the many solar energy conversion methods? The simplest way of all is to convert the solar ray by a thermal engineering process. By the way, this method is already widely used today in the southern regions of our country where solar power is utilized for everyday needs: heating buildings, distilling and heating water, charging thermoelectric converters. For this they use solar collectors whose use, according to the calculations of scientists, is also economically profitable in other areas of the country up to 56 degrees North latitude. Larger installations are already being planned, including even experimental thermal electric power stations. In the deserts and salt marshlands one can use the energy of the sun in solar hothouses, for lifting water to other levels, and for distilling it.

Scientific discoveries made in recent years in semiconductor physics and chemistry have led to fundamentally new solutions to the solar energy conversion question as, for example, by the photoelectric method. Solar batteries have appeared which have made the flights of space ships and orbital stations possible today. Even an airplane, whose engines use solar power, has flown. Batteries on the wings and fuselage of the airplane have generated as much energy as is sufficient for a short flight by this unusual aircraft. The KPD [efficiency] of the solar batteries at present do not exceed ten percent but the scientists are already obtaining better results in the laboratory.

It is known that the task of converting solar energy into chemical energy has been done successfully by plants. It is true that the KPD of such conversion is only a fraction of a percent on the average throughout the entire world. But this is what is interesting--minute chlorella algae know how to increase this KPD up to six percent. Can it be made any higher and, if it can, then how? Scientists from the Institute of Photosynthesis, the Institute of Biochemistry imeni A. N. Bakh, the Institute of Plant Physiology of the USSR Academy of Sciences, and Moscow State University are carrying out research in this area.

Among the methods for the practical use of biological processes to convert solar energy, the process of accumulating a biomass by the action of sunlight on a plant is of interest. Bacteria make a biomass into high-energy fuel, for example, methane. By the way, with the help of methane-generating bacteria one can also obtain fuel from agricultural waste products--treated beet tops and straw. At the same time excellent fertilizers with high nitrogen and phosphorus content are also obtained. Even food industry wastes can be reprocessed to obtain energy. Such an arrangement is already in operation in our country at the Yefremovskiy Biochemical Combine. At the Moscow Water Purification Station they are obtaining methane during the purification process. Enough is being produced not only for the production cycle but also for the needs of a small settlement.

The time will come when the sun which is a great puzzle to scientists today will give people cheap power. Science must make a great step forward in this direction in the 11th five-year plan. It is possible that the sunbeam, converted by special installations into a great power force, will soon raise powerful airships into the sky, set motor vehicle and maritime vessel engines going, and heat cities and settlements. The sun will serve the people. The scientists are working on this today."

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ENERGY CONSERVATION

SMALL ENTERPRISES RESPONSIBLE FOR LARGE ENERGY LOSSES

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 24 Mar 81 p 2

[Article by V. Murovanyy, Chief, Territorial Inspection Office for Surveillance Over the Use of Gas in the National Economy: "The Arithmetic of Losses"]

[Text] During the 26th CPSU Congress the editor's office was visited by a group of delegates from the party forum--the best producers of Kemerovskaya Oblast. They described the measures being implemented by the oblast party organization to economize in all areas of production. In particular much has already been done to save fuel and electric energy. But there are still many reserves of thrift. On 1 March 1981 workers of Kemerovskaya Oblast published their appeal "The Economy Must be Economical!" in SOTSIALISTICHESKAYA INDUSTRIYA, in which they asked all of the country's labor collectives to actively join the competition for all-out economization of fuel and energy. Their appeal found hearty support: Laborers sent replies from all corners of the country. As early as on 7 March we published one such reply--an article entitled "A System of Thrift" by P. Krekshin, assistant chief power engineer of the Steel Rolling Mill imeni 50-letiye Oktyabrya.

Today the editor's office continues the discussion started by delegates to the 26th CPSU Congress, the best producers of Kemerovskaya Oblast.

There is perhaps no raw material more valuable at the present level of industrial development than natural gas. It is used in the production of ammonium, acetylene, synthetic rubber, plastic, capron, nylon, drugs, and many other things. Enough plastic water pipes for a 250-apartment complex can be made from a ton of polyvinylchloride. A ton of ammonium can produce 3-5 tons of fertilizer. One would think that anyone with even a grade school education would be aware of this. And yet, little value is placed on gas. Each time industrial enterprises are inspected, considerable losses are revealed. Because people resist technological change, because some engineering concepts are faulty, or simply because of oversights, thousands of cubic meters of this valuable raw material literally go up in smoke.

The annual losses of natural gas at enterprises of ferrous metallurgy total hundreds of millions of cubic meters. Just "Krivorozhstal'" alone lost 123 million cubic meters of gas last year. The reasons are many: The steam boilers of three TETs's are not adjusted for optimum operation, there is no automatic control, not all blast furnaces use evaporative cooling, and so on.

It is commonly believed that the large, energy-intensive enterprises are the ones usually responsible for the large losses. This might be so, but let us also take a look at the small ones. Take as an example "Krasnyy metallurgist" Association's rubber footwear plant in Kiev. To be blunt, there is no pleasure in what we see in its shops. Water economizers installed on the boiler units are inoperative, expensive automatic combustion regulators do not work, and the burning schedules do not permit effective use of gas. The losses of just two boilers exceeded half a million cubic meters in a year. The enterprise does not maintain satisfactory records on the amount of thermal energy it produces and consumes. As a result the fuel losses total 800,000 cubic meters per year, or a fourth of total gas consumption. We also find the same thing at the Kiev Experimental Industrial Plant of Rubber and Latex Articles of the same Ministry of Petroleum Refining and Petrochemical Industry, where gas combustion is regulated manually, and where the condensate collecting and recycling system works poorly.

Consider furthermore that small enterprises are far greater in number. It would even be difficult to count them all up. What we need is for every executive and every worker to treat the business entrusted to him by the state as his own. Concrete proposals suggested by delegates to the 26th CPSU Congress--the best producers of Kostromskaya Oblast, who wrote a letter to SOTSIALISTICHESKAYA INDUSTRIYA--acquire invaluable significance in this respect.

The very idea of a movement for economization of energy resources with the slogan "Each is an Economist at His Own Workplace" is enough to stir anyone's soul. It has a way of encouraging all laborers, specialists, scientists, and business executives to take an active part in the struggle for thrift.

But this means that there should be not a single production section and not a single engineering service in which waste is not reacted to swiftly. This simple truth is not all that easy for people to assimilate in practice. There can be no other explanation for the fact that an enterprise such as the Brovary Powder Metallurgy Plant, while fighting actively to economize on metal, overconsumes natural gas just as energetically.

Executives of the Ministry of Construction, Road, and Municipal Machine Building's "Krasnyy Ekskavator" Plant in Kiev would perhaps be insulted if they were told that their enterprise was not the best in every way. But its boiler plant is in dilapidated condition, the efficiency of the boilers is extremely low, the water economizers are kept turned off, optimum operating schedules are not maintained, and records are not kept on heat production and gas consumption. The furnaces and dryers are not equipped with gas recycling systems and automatic combustion control systems, the gas burners are uneconomical, and heat insulation is poor. Irrational gas consumption totals 2.3 million cubic meters annually, or 17 percent of total gas consumption.

Inspections revealed impermissible losses at the Zmiyevskaya GRES and at the Voroshilovgradskaya, Dnepropetrovskaya, and other thermal power plants.

Unfortunately the administration of the office of inspection of the use of gas in the national economy often finds itself powerless. The rights it does possess are rather meager. The only thing we can do is submit proposals to the rayon executive committee's administrative commission to have the housing operation office responsible for a reluctant executive impose a monetary fine; even so, the fine cannot exceed a hundred rubles. Thus the fight in behalf of state interests is equated with domestic squabbles (?!). We are dealing with losses in the millions, but the violators get off with nothing more than a slap on the wrist, as if they were nothing more than fighting housewives. Such a punishment might be effective, were such violations rare. But the way things are today, this is no way to set things straight. The way things are today, we can do no more than suggest, propose, and plead. In the end, the wasters of the people's wealth are let off with 15-20 ruble fines, which are often immediately compensated for by bonuses for surpassing the plan.

The departments to which the enterprises are subordinated, meanwhile, rather than making the strict demands that are fully within their power, are in no hurry to monitor adherence to the planned indicators.

If we look into the essence of the problem, we would find that the main cause of overconsumption of fuel is the absence of specific consumption norms, or their technically incorrect application. The specific fuel consumption norm for the same equipment in different ministries differs. It is often different even within the same department. Sometimes old heating units are replaced by new, more economical ones, but the specific fuel consumption norms are left the same.

Now, following the 26th CPSU Congress, a deep search for the reserves of effectiveness is proceeding in all areas of the country's huge economy. Following the example of the workers of Kemerovskaya Oblast, the socialist competition for economization of energy is unfolding at every workplace. New reserves of fuel economization have been found, for example, by scientists of the Donetsk Polytechnical Institute. The country's first gas preparation station, built on the basis of a plan drawn up by the Mine imeni Gor'kiy, has been put into operation at that mine. Formerly dangerous, methane extracted from the mine is now enriched with natural gas, transforming the "firedamp" into safe, high-calorie fuel. The automatic station will halve the amount of natural gas consumed by the boiler plants. There are plans for building 20 such mixing stations in the Donetsk Basin. This is a substantial reserve. But it is not the only one. If we think and act together, we could quickly and effectively solve the pressing problems of economization.

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URAL'SKAYA OBLAST ENJOYS HARD-WON ENERGY SAVINGS

Moscow PRAVDA in Russian 7 Mar 81 p 2

[Article by V. Stepnov: "The Price of a Kilowatt-Hour"]

[Text] Ural'skaya Oblast does not have any industrial giants like the Kama Motor Vehicle Plant or Magnitka. What we usually see here are small enterprises producing pipe fittings, spare parts for tractors, construction and installation equipment, and fur clothing. The number of workers is not great, and the production volume does not go above several million rubles per year. And it is in relation to enterprises such as these that a rather persistent opinion has evolved: The amount of electric and thermal energy they consume is unjustified, and the efforts of energy economization are weak. They worked this way in the past, it is said, and they work this way now. But inspection of the experience of Ural'sk workers would change the evolved impression.

In their pledges for 1979, the oblast's laborers promised to save 4.5 million kilowatt-hours of electric energy, and in fact they saved 6 million. And they went even further. Last year they planned to save as much as 8 million kilowatt-hours. This pledge was satisfied.

At first glance the results might appear modest. There are oblasts which have pledged to save tens of millions of kilowatt-hours. But the absolute terms in which they state their pledges are not the sole indicator of an economical attitude toward the people's wealth, and they are not always the most objective indicator. After all, the price of a kilowatt-hour saved can vary. For example it is much easier for an aluminum plant, which has an insatiable appetite for energy, to save energy than it is for a sewing factory in the oblast's local industry. But in both cases it is just as expensive. No matter where we go, 1 kilowatt-hour would be enough to bake 36 kilograms of bread or smelt a kilogram and a half of steel. Perhaps this is the approach we should take to assessing the efforts of the workers of Ural'skaya Oblast in their struggle for savings.

Let us visit the Ural'sk Hardware Plant imeni V. I. Lenin. Each year its collective saves about 400,000 kilowatt-hours of electric energy. It has been a winner of the oblast competition for economization of fuel and energy resources many times. The reaction here to even the slightest waste is swift, and many reserves are put to use. Thus the lighting of the plant grounds is controlled by photoelectric cells. An automatic system turns on the lights at the proper time, and it does not forget to turn them off at dawn.

"In my estimation, the best way to save electric energy is to improve the design of the articles and the production processes," notes plant director V. Martynenko. "Take the condensate drains we produce as an example. They are simple articles, with just four parts. One of them is the drip pan. We used to saw the blank for it out of a bar, and then we worked it on machine tools, consuming 105,000 kilowatt-hours per year. Now we stamp it out of sheet steel, and we get by with 6,000 kilowatt-hours. We did not need to acquire any expensive equipment--we used what we had. We saved even more when we converted to compression molding of parts requiring mechanical working."

Implementation of such measures is reinforced by high exactingness toward the people, and by educational efforts. At the plant's party election meeting, senior power engineer Yu. Yudin called the leaders of the casting shop wastrels because their conveyer was clogged with dirt, owing to which a higher load was being imposed on the drive mechanism, and consequently electric energy consumption was higher. The metallurgists accepted this criticism, and the conveyer was quickly set in order. But even the main power engineer is sometimes taken aside in a shop, where he is shown a lamp of excessive wattage in some passageway or a cracked gate through which heat is lost, and he is asked to take steps to deal with the problem. The public commission for economization of electric and thermal energy wields authority at the plant. It insisted, for example, that banked machine tools be installed in one of the sections. This made it possible to raise labor productivity and economize on energy.

"We do everything we can to publicize the experience of the hardware plant," said Ural'skaya Oblast Party Committee Secretary M. Gizatulin. "We do not interfere in concrete technical issues, but we believe it our duty to nurture discipline and economy, using the best collective as an example. For example, executives of many enterprises are not pleased with the restrictive schedules according to which electric energy is turned off periodically. But at the hardware plant such shutdowns are practically painless, inasmuch as everyone prepares for them beforehand."

True, the oblast party committee does not lead the enterprises by the nose. But it does keep control over the use of fuel and energy resources. On the committee's initiative and in response to its persistent appeals, the city thermal electric power plant was converted from fuel oil to natural gas. As a result the heat supply improved, the need for fuel oil shipments was eliminated, and the air above the city became noticeably cleaner. The next projects are to create a central dispatcher's station in Ural'sk to control energy management, and to interconnect the radial power supply lines extending into the countryside. Strict accountability for expenditure of fuel and energy resources has been instituted with the oblast committee's support. In fall and winter the enterprises draw up the appropriate summaries for every 10-day period, while large enterprises even make up daily summaries. In every case waste is immediately detected, and emergency measures are implemented on the spot.

Ural'skaya Oblast does have problems having a significant impact far beyond the boundaries of the region. One such problem is consumption of electric energy in agriculture. To date, the kolkhozes and sovkhozes still have no norms of energy consumption per unit product--per ton of grain, meat, or milk. Inasmuch as they have no objective criteria indicating the effectiveness of energy use, the farm

collectives cannot participate in the competition for economization of energy. The situation is aggravated by the shortage of electric measuring instruments. Power consumption is estimated from the theoretical output capacity of the equipment of a farm, and charges are kept constant irrespective of the actual amount of energy used.

Can we achieve a real interest in economization under such conditions? After all, no matter how well people work, what is deemed most important is the total amount of energy contracted for. And so energy is consumed haphazardly. As an example an outdoor animal watering trough might be supplied with an electric heater that works around the clock. And no one has any complaints about a lamp the size of a watermelon burning day and night in the cattle yard.

Enterprises of the Ministry of Instrument Making, Automation Equipment, and Control Systems are producing an entirely insufficient amount of meters. The reason for this, obviously, is that because their cost is so low, these simple instruments have earned the reputation of being unprofitable to produce. Thus we find that expensive computers could be purchased at any store while cheap meters have become scarce.

The workers of Ural'skaya Oblast are thinking about climbing one step higher in the first year of the 11th Five-Year Plan--saving 9.6 million kilowatt-hours of electric energy.

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ENERGY CONSERVATION

LOW GAS COST ENCOURAGES OVERCONSUMPTION AT HOME

Moscow GAZOVAYA PROMYSHLENNOST' in Russian No 2, Feb 81 p 22

[Editorial: "Gas or Electricity? The Debate Goes On: Do We Need Gas Meters?!"]

[Text] The issue of economical use of natural gas at home, raised by GAZOVAYA PROMYSHLENNOST' (No 9, 1979 and No 8 and 12, 1980), continues to agitate the readers. Among responses received by the editor's office, there is an interesting letter from the chief of the Fergana City Gas Office of the All-Union "Soyuzuzbekgazprom" Production Association, I. Sh. Siradze.

The letter's author notes in particular that gas ranges presently in use are obsolete. They differ little from ranges produced 20-25 years ago, and they are not in keeping with the effort to economize on gas consumption. However, the author is in disagreement with the assertion that the problem may be solved by replacing existing ranges by so-called electric-gas ranges- that is, by gas ranges equipped with an electric oven, use of which would supposedly produce a savings of 1.5 billion cubic meters of natural gas and 0.5 million tons of liquefied gas.

The problem is that gas consumers are not materially interested in using the electric part of such a combined range. The reverse is more likely, since they must pay for every kilowatt-hour of electric energy consumed, while gas is much cheaper to the consumer: just 15-19 kopecks per person per month, even with the burners left constantly on. Therefore gas is often kept burning around the clock in homes, especially in the cold part of the year, and the ovens of gas ranges are used for heating, rather than for their intended purpose. Under these conditions we cannot count on just the consciousness of the gas consumer; strict accounting is necessary as well. I. Sh. Siradze goes on to cite several examples of the use of gas by the public and by communal and personal services enterprises in Fergana. The city's gasification level is 97.5 percent. The state housing pool and the communal and personal services enterprises are fully gasified. Out of 34,500 gasified apartments, 12,500 are equipped with local gas heating, and the rest enjoy the services of central heating from the city thermal power network and its thermal electric power plant.

In winter, when it becomes cold, the gas shortage becomes acute. There is not enough gas not only to heat apartments, but even to prepare food, even though the city receives its established daily quota, which is sometimes exceeded by 20-30 percent. Where does the gas go, we ask? Why are efforts aimed at economical use of gas by the public and by municipal and personal services enterprises ineffective?

Gas meters were installed on terminal gas lines in some rayons for control purposes; they showed that gas consumption in these regions exceeded the set norm by 2.5-3 times. Such overconsumption stems from the fact that gas heaters (steam boilers) in apartment complexes do not meet today's requirements. Their efficiency is very low, the temperature of exhausts is high, and it is practically impossible to utilize this heat. The smokestacks of some furnaces are straight, as a consequence of which the combustion products rise into the atmosphere unused.

There is one more important circumstance. Whenever the Fergana city heating network or the thermal electric power plant fail to maintain the temperature of the heat carrier at its appropriate level, or when central heating is turned off in apartment complexes for some technical reason, the residents turn on their gas ranges as a way to heat their rooms. And no educational efforts can help here, Comrade Siradze believes. Few residents would turn on their electric ovens to heat their apartments. Practice has shown that residents rarely purchase electric heaters, even though they are available in all stores. They wait for gas. It is by far cheaper. Hence millions of cubic meters of gas are overconsumed in winter just in Fergana alone.

Natural gas belongs to the people, and it cannot be burned without control, without an accounting. I. Sh. Siradze asserts that we need gas meters, and strict payment for gas consumption. Were such meters to be installed, every resident and every executive of a municipal and personal services enterprise would keep track of their readings, and then the savings of gas would be typified by a by-far greater figure than 1.5 billion cubic meters.

If we are to produce combined electric-gas ranges, we should install them where electric energy is cheaper than gas.

The editor's office feels I. Sh. Siradze's ideas to be sufficiently important and justified, and it hopes that the problem of strictly controlling gas consumption for domestic needs would be examined by the appropriate organizations.

11004
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GAS INDUSTRY DEVELOPMENTS REVIEWED

Moscow EKONOMICHESKAYA GAZETA in Russian No 13, Mar 81 p 2

[Text] Gas industry is a relatively young sector of the fuel and energy complex. It developed at a high rate in the 10th Five-Year Plan. In 1980 gas extraction in the country attained 435 billion cubic meters, which is a time and a half more than in 1975.

In the past five-year plan the principal efforts were directed at quickly increasing the gas potential of West Siberia, the sector's main source of its raw materials. As a result gas extraction increased to 156 billion cubic meters, or by 4.4 times over the 1975 level.

Formation of the large fully automated gas and chemical complex in Orenburg was completed in the 10th Five-Year Plan. This complex concurrently produces, in addition to gas, a large quan ity of sulfur and other highly valuable products for chemistry and petrochemistry. Gas is carried from Orenburg by the "Soyuz" main pipeline to European CEMA countries that had participated in the gas pipeline's erection. The long-range specific-purpose program for cooperation among CEMA countries foresees satisfying their economically justified demands for the basic forms of energy and fuel until 1990.

Gas industry in the Turkmen SSR enjoyed further development. The Shatlykskoye and other oilfields were successfully developed. Gas extraction increased in 1980 to 70.3 billion cubic meters, growing by 1.4 times over the 1975 level.

The main gas fields are located significant distances away from the places of gas consumption. The Unified Gas Supply System was created in the country, and it is now undergoing development. In the 10th Five-Year Plan the Ministry of Construction of Petroleum and Gas Industry Enterprises and the Ministry of Gas Industry built and initiated operation of 30,000 kilometers of gas pipelines and 208 compressor stations. The total length of the main gas pipeline exceeded 130,000 kilometers.

The national economy's gas consumption increased by 32.4 percent in the 10th Five-Year Plan as a whole. This included a 66 percent increase in chemical industry, a 17.4 percent increase in ferrous metallurgy, 23.7 percent in machine building and metalworking, and 37.2 percent in the municipal and personal services sector. In the 5 years, the quantity of gasified apartments in the cities increased from

66 to 73 percent, while in rural areas the figure increased from 46 to 73 percent. Gas is used in the home by almost 200 million Soviet people, who pay the lowest price for it in the world.

The Tasks of the 11th Five-Year Plan

Gas extractors and builders face new, sizeable tasks in the 11th Five-Year Plan. In his report to the 26th CPSU Congress, Comrade L. I. Brezhnev emphasized the need for quickly increasing gas extraction in West Siberia, and for creating new high-capacity gas mains that could deliver this gas to the European part of the country.

The "Basic Directions of the USSR's Economic and Social Development" set the target of raising gas extraction to 600-640 billion cubic meters in 1985. The gas reserves available in West Siberia are large enough not only to compensate for the gradual decrease in gas extraction in a number of old fields, but also to increase the volume of gas supplied to the country.

In the north of Tyumenskaya Oblast, the Medvezh'ye, Vyngapurskoye, and Urengoyskoye gas fields will supply the required gas in the 11th Five-Year Plan. In subsequent years the Yamburgskoye, Zapolyarnoye, Yubileynoye, and Kharasaveyskoye fields are to be developed.

The scale at which the natural resources of this harsh region of the country are being developed may be deduced from the example of Urengoy. Gas extraction is to be increased here from 50 to 250 billion cubic meters within 5 years. Thus in 1985 this field should begin producing more than a third of the country's gas. More than a thousand producing wells will have to be drilled, 16 highly productive integrated gas preparation facilities will have to be built, and about 6,000 kilometers of gas field and gas collection pipelines and 700 kilometers of motor highways will have to be laid in the vicinity of Urengoy. Capital investments equal in volume to the amount actually spent to erect all of the sector's facilities in West Siberia in the past five-year plan will have to be directed into industrial construction at this field.

Concurrently with developing the gas extraction complex, we will build 1.3 million square meters of housing space, medical and preschool institutions, cultural and personal services facilities, trading enterprises, and public dining halls in West Siberia in 1981-1985. The population of the young cities of Nadym and Novyy Urengoy is to increase significantly by 1985.

Expansion of exploratory and operational drilling is also foreseen in other regions of the country. Gas extraction is to be raised to 81-83 billion cubic meters in the Turkmen SSR in 1985. A number of new fields will be placed into production in the republic, to include the Sovetabadskoye field; by the end of the five-year plan it will be producing 8 billion cubic meters per year. Gas extraction in the Uzbek SSR will increase by half a billion cubic meters by as early as 1981. As before, Ukrainian gas fields will continue to be major gas suppliers.

The Nagumanovskoye gas condensate field was discovered in Orenburgskaya Oblast and the Karachaganakskoye field was discovered in northwest Kazakh SSR. After the exploratory operations are completed, they will become an additional source of gas for the Orenburg complex.

There are plans for beginning formation of an industrial complex at the Astrakhanskoye gas condensate deposit.

Further growth in the natural and by-product gas refining capacities is to occur in the 11th Five-Year Plan; valuable components contained in this gas are to be extracted. In 5 years the natural gas refining volume is to be increased to 28 billion cubic meters, which is a 40 percent increase over the 1980 level. Production of liquefied gas will exceed 11 million tons in 1985; this is equivalent to a 26 percent increase over the 1980 level.

The Unified Gas Transportation System

	Gas Pipeline Length (1,000 km)	Compressor Station Output Capacity (million kw)
1970	68	3.5
1980	130	18
1985	180	43

Further development of integrated use of natural gas will be represented by expanded production of sulfur, condensate, stable gasoline, liquefied gases, and other components. In 1985 the volume of deep natural gas refining will increase to 75 billion cubic meters. Production of sulfur from natural gas is to be increased by 25 percent in the 5 years.

A gas condensate extracting, processing, and transporting complex is being created in West Siberia. Gas condensate extraction is to be organized at the Urengoyskoye deposit.

The Unified Gas Supply System

Development and creation of large systems of gas pipelines leading northward from the Urengoyskoye deposit will continue in the current five-year plan; these systems will deliver gas to the country's northwestern regions, the Baltic, and Belorussia. Traveling through other systems, gas will reach consumers in the Urals, the country's center, and the Volga. Underground gas mains will be built in order to satisfy the growing demand for gas in the Ukraine, Moldavia, the North Caucasus, the Central Asian republics, and other regions of the country.

A number of high-capacity gas mains with a pipe diameter of 1,420 millimeters and a rated pressure of 75 atmospheres will be placed into operation. These include the Urengoy-Gryazovets gas pipeline, 2,280 kilometers long. It will carry 30 billion cubic meters of gas per year. The Urengoy-Petrovsk gas main (2,410 kilometers)

is intended to carry 32 billion cubic meters, while the capacity of the Urengoy-Yelets gas pipeline (3,250 kilometers) will be 34 billion cubic meters. A total of about 50,000 kilometers of gas mains and 360 compressor stations with a total capacity of 25 million kilowatts are to be built and placed into operation in the five-year plan.

Gas transportation will be increased and the country's Unified Gas Supply System will undergo further formation; new equipment characterized by high unit output capacity and great effectiveness is to be employed. Enterprises of the Ministry of Power Machine Building, the Ministry of Shipbuilding Industry, the Ministry of Chemical and Petroleum Machine Building, and the Ministry of Aviation Industry are called upon to increase deliveries of gas turbine units of progressive design with an output capacity of 25,000 kilowatts each, and ship and aircraft machine units with capacities of 10,000 and 16,000 kilowatts. Use of such equipment guarantees a two to three time decrease in compressor station construction time, a 50 percent drop in labor outlays, and faster assimilation of the planned capacities of the gas pipeline systems.

Enterprises in ferrous metallurgy must begin supplying the routes with gas pipelines covered with insulation at the plant. For every 1,000 kilometers of piping covered with such insulation, we save the labor of 200-300 workers and relieve a large quantity of pipe-laying machines, installation, and cleaning equipment for other purposes.

Surveillance over the state of gas pipelines is to be improved significantly as a means for insuring highly reliable operation of the mains in this five-year plan; improvements include the use of new diagnostic methods and introduction of laser technology to find leaks. A new system of preventive and restorative repairs is being created for gas pipelines. The level of automation of compressor stations and level of remote mechanized control of gas transportation systems will rise in 1981-1985.

The capacity of underground gas reservoirs will increase in the principal fuel-consuming regions. Today there are more than 30 such reservoirs operating in the country. In 1980 they received about 20 billion cubic meters of gas--a time and a half more than in 1975.

Underground reservoirs will be built and expanded in the current five-year plan in the Northern Caucasus, in the Transcaucasus, in the Ukraine, along the Volga, in Central Asia, and in other regions. Expansion of the network of underground reservoirs will make it possible to double the volume of gas they can store.

Economical Utilization of Gas Resources

Natural gas is an irreplaceable national treasure. Sensible and effective use of gas, as well as all other fuel and energy resources, is acquiring the most important significance.

There are many reserves for economization in gas industry. More-progressive methods and equipment for developing deposits are to be improved and developed further with the purpose of increasing the gas yield of the beds. Experimental exploitation of

the Novotroitskoye gas condensate deposit in the Ukraine will begin in 1981. A cycling process will be involved. This new method for developing gas fields, in which dry gas is pumped into a productive formation, makes it possible to increase the amount of condensate extracted from a bed by 15-20 percent.

The sector's laborers must reduce the amount of gas consumed by their compressor stations, and the losses of gas during its transportation.

Gas consumption is growing in all sectors of the national economy. The writing of standards and the accounting of gas consumption must be set in strict order, economical gas burners and gas-powered equipment must be introduced more broadly, and replacement and modernization of obsolete equipment and machine units must be accelerated. This pertains not only to industrial enterprises but also to housing services and municipal management.

The state plan for 1981 requires extraction of 458 billion cubic meters of gas--23 billion more than in the previous year. The sector's laborers started their work successfully in the current year. They satisfied the higher socialist pledges they adopted in honor of the 26th CPSU Congress. Collectives of the "Nadymgazprom", "Orenburggazprom", "Ukrgazprom", and "Shatlykgazprom" associations are making good progress toward their targets.

In January and February, 76.8 billion cubic meters of gas were extracted--7 percent more than in the same period of last year.

A competition to extract 3 billion cubic meters more gas than required by the annual plan and to raise the reliability of gas supply to the national economy has been started in the sector.

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UKRAINIAN GEOLOGICAL EXPLORATION RESULTS, PLANS DESCRIBED

Kiev NEFTYANAYA I GAZOVAYA PROMYSHLENNOST' in Russian No 1, 1981 pp 1-3

[Article by P. F. Shpak, minister of geology of the UkSSR: "Main Results of Geological Exploration for Oil and Gas in the 10th Five Year Plan and Tasks for the 11th Five-Year Plan"]

[Text] The geological exploration organizations of the UkSSR Ministry of Geology did a lot of work in the 10th Five-Year Plan to increase the explored natural gas and oil reserves.

In the Dneprovskiy-Donetsk basin, and within the Poltavskaya and Khar'kovskaya Oblasts, five new zones of oil and gas accumulation were found. The industrial productivity of two new levels of oil and gas content were established: the Nizhnevizeyskiy-Turneyskiy at a depth of 4500-5500 m, and the Serpukhovskiy at depth of 3700-4300 m. Thirteen fields were discovered in these deposits, including the Yablunovskiy and Kotelevsko-Berezovskiy. The finding of the Yablunovskiy gas condensate field in the center of the Zhdanovsk depression, and the production of gas flows at th Slobodskiy and Lutsenkovskiy fields on the outskirts of the Srebnenskiy depression initiated the development of the region's major depression zones that occupy about 20% of the territory of the Dneprovskiy graben.

Deposits linked to nonanticlinal traps have been discovered in recent years at six fields because of purposeful searches.

The great promise of the deep deposits is confirmed by the industrial supplies of gas that were produced from depths over 5000 m. The gas yield in well 15 of the Kotelevskiy field from depth of 5358-5489 m was 515,000 m^3/day, and in well 1 of the Yablunovskiy elevation from the 5011-5101 m interval it was 1.3 million m^3/day.

Thick, developed Jurassic deposits have been established in the northwest Bil'che-Volitskiy zone of the Ciscarpathian depression. Reef facies have been found in its upper carbonate section. It is planned to localize the reef massifs within the belt stretching parallel to the Krakovetskiy fault. Promising levels in the autochthonous Paleogenic and Mesozoic deposits have been found in the Pokutsko-Bukovinskiy section of the depression. Oil supplies have been obtained both from the deep deposits (Zavodskiy, Yuzhno-Monastyretskiy and Rozhnyatovskiy fields), and from the shallow (1000-1500 m) depths (Lukvinskiy, Rudavetskiy structure) of the Borislavsko-Pokutskiy zone.

An industrial gas bed has been discovered at depths of 800-900 m in the Volyno-Podol'skiy edge of the East European platform within the Lokachinskiy swell in terrigenous formations of the middle Devonian period. This broadens the outlook for this vast territory.

Five fields have been discovered in the south of the republic. Gas beds have been established in the maykop on the Kerch' diapir periclines. Upper Jurassic reef complexes and terrigenous collectors have also been found in the Neocomian section within the eastern dip of the mountainous Crimean region.

In the 10th Five-Year Plan, the ministry discovered a total of 37 oil and gas fields, including two major ones. Industrial development was started on 19 fields, as well as 133 productive wells with high total, daily yield of gas, oil and condensate.

The indicated results were obtained thanks to the introduction of new methods of searching for oil and gas fields, the further perfection of the structure of controlling, concentrating and specializing auxiliary production, as well as the study and spread of the experience of the leading collectives.

In order to accelerate the rates of geophysical work to prepare structures for deep drilling, seismic operations were switched to the technique of common deep point (MOGT) with subsequent processing of the information on a computer. When MOGT was used, the volumes of work more than doubled. Work was expanded using the field system of observations, longitudinal-nonlongitudinal profiling (PNP) and the "wide" profile technique. This increased the reliability of the structural plottings for the promising levels. The volumes of seismic work using nonexplosive sources rose more than 12-fold. This guarantees protection of the environment and fulfillment of studies on the fields with a dense network of pipelines.

The volumes of well drilling using the new highly productive three-cutter bits in the AN and AV series, high momentum turbodrills type A and TSSh, inhibited drilling solution with low solid phase content, high-strength drilling casing and pumping-compressor pipes increased 1.5-2-fold. Regulated technical inspection and monitoring were introduced everywhere in the construction of deep wells in accordance with the approved planning documents.

There are showers and organized hot meals at the deep drilling boreholes. At the distant boreholes the workers are provided with housing.

The drilling brigades of USSR State Prize laureate F. Z. Rymarenko and N. L. Tikhonovskiy in the 10th Five-Year Plan were obliged to drill one well above the plan from the conserved resources. Their example was followed by 62 drilling brigades. This resulted in drilling of 172,800 m of wells from conserved resources in the five-year plan.

The initiative of the derrick-installation brigade of USSR State Prize Laureate L. I. Varagash on the introduction of the brigade contract was supported by all the derrick-installation and 75 drilling brigades. The brigade contract was used to build 297 boreholes and drill over 100 wells in the five-year plan.

The indicated measures permitted fulfillment of the five-year plan for drilling deep exploratory wells for the ministry as a whole by 101.5%. As compared to 1975,

the commercial drilling rate rose by 25% in 1980. Drill tunneling increased by 21% and the mechanical rate rose by 20%. The associations "Zapukrgeologiya" and "Chernigovneftegazgeologiya" achieved the best results in improving the drilling rate.

In the 11th Five-Year Plan, 75% of the geological exploration will be concentrated in the Dneprovskiy-Donetsk basin. The focus of attention will be study and evaluation of the oil and gas content in lower Carboniferous beds where 70% of the predicted and 90% of the long-term hydrocarbon reserves are located.

The modern period of development in the Dneprovskiy-Donetsk basin is transitional. Whereas previously the increase in oil and gas reserves here was chiefly guaranteed by the lower Permian-upper Carboniferous complex, now the future is linked to lower Carboniferous deposits. The significant difference in the conditions for exploration and prospecting of the new fields as compared to the past period consists of the great dispersal of hydrocarbon reserves over the field and the section in the lower Carboniferous complex of rocks. This requires considerable volumes of exploration work and time to prepare the reserves.

Further concentration of geological and geophysical research within the depression zones of the Dneprovskiy-Donetsk basin is associated with the development of new types of traps that differ from the traditional exploration objects because of their small amplitudes and lack of linear arrangement. The detection, charting and exploration of these objects not only requires improved quality of the exploratory work, but also the use of new procedures. In addition, the exploratory work in depressions and on the deeply submerged, long-term levels of shafts and projections require development of the 6000-6500 m depth interval.

The lower Permian-upper Carboniferous productive complex takes second place. The focus of attention will be exploration of the sections near the ore blocks mainly within the Machevka-Shebelinskiy zone. The promising nature of the tectonically screened traps has been proven here.

Exploration of oil and gas fields in the western Ukrainian regions is associated with clarification of the geological structure and oil and gas content of the long-term complexes.

In the Bil'che-Volitskiy zone, primary attention will be given to search for hydrocarbon beds in the Jurassic deposits. Based on a distribution of the facies of the middle Jurassic and other factors, the section to the west and northwest of the Rudkovskiy field will be of the greatest importance.

It is planned to continue the work in the Borislav-Pokutskiy zone on individual, not yet explored structures and turned-under wings of the folds (South Monastyretz, Roshnyatov, Stanylya).

At Volyno-Podoliya, the primary object of exploration will be the Devonian, Silurian and Cambrian deposits on the eastern side of the L'vov Paleozoic depression. The section that adjoins from the north, west and south to the Lokachi swell should be considered the most promising here.

In the south of the republic, the Paleogenic, Lower Cretaceous and the Upper Jurassic deposits of the Kerchenskiy peninsula are characterized by the greatest

concentration of predicted reserves of hydrocarbons. This region and the complexes are viewed as the primary objects of oil and gas exploration and prospecting for the 11th Five-Year Plan.

In the west Black Sea region, the search for oil and gas in the terrigenous formations of the Middle Jurassic and reef rocks of the Upper Jurassic age, Triassic and Paleozoic deposits within the local elevations of the Preddobrudzhinskiy depression is very important.

In the 11th Five-Year Plan, it is planned to increase the volume of geophysical work 1.3-1.4-fold, and the preparation of structures 1.2-fold. Special attention will be concentrated on improving the quality of geophysical materials by further technical and methodical re-arming of geophysical work. For this purpose it is envisaged that 70-80 digital "Progress" stations, 150-170 nonexplosive SV-5-150 and GSK-6 sources, and new modifications of seismodynes will be introduced. It is planned to re-equip the active computer centers with new complexes based on the EVM-PS-2000 and PS-3000. This will increase the volumes of detailed processing of seismic information. In studying complexly-constructed fields it is planned to increase the volumes 1.5-2-fold using efficient field observation systems.

In order to further improve the quality of drilling operations and reduce the periods of well construction, the associations jointly with the UkrNIGRI [Ukrainian Scientific Research Mining Institute]have developed target programs to increase the drilling rate 1.3-1.5-fold. The following are the most important measures of the indicated programs: increase in the volumes of well drilling using the latest rock bits of the GNU and GAU type with hermetically sealed support by 1.9-fold, increase the highly efficient drilling solutions with low solid phase content 1.7-fold, increase the optimized drilling power regimes 1.5-fold, and develop new drilling technology with balanced pressures in the well-bed system.

In preparing for a worthy meeting of the 26th CPSU Congress, the ministry geologists have taken socialist commitments upon themselves to increase the explored oil and gas reserves, and improve the quality and efficiency of the geological exploration.

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EFFORTS TO RAISE TATAR OIL PRODUCTION DESCRIBED

Moscow NEFTYANOYE KHOZYAYSTVO in Russian No 3, Mar 81 pp 2-5

[Article by Tatneft' General Director A. K. Mukhametzyanov: "The Reserves of the Tatar Oilfields--into the Fund of the New Five-Year Plan"]

[Text] The collective of the Tatneft' Association made a significant contribution to the sector's successes in the 10th Five-Year Plan. It surpassed its targets by more than 900,000 tons of extracted petroleum, it placed about 5,000 new wells into operation, it sold 22 million rubles worth of products in excess of the plan, and its specific labor outlays on well maintenance dropped by 21 percent in comparison with 1975. In addition to this, Tatar oilmen did a large amount of work according to the expeditionary shift method in order to create new petroleum extracting capacities in West Siberia. The collective satisfied its precongress socialist pledges.

These achievements were based upon an active search for and accelerated introduction of effective technical concepts in all production areas, the great organizational efforts of business managers and the party, trade union, and Komsomol organizations, and the practical assistance provided by the oblast CPSU committee, the management and central administration of the Ministry of Petroleum Industry in solving vitally important problems of the region's development.

During the 10th Five-Year Plan the association began a qualitatively new, more-complex stage of its development. A planned decrease in petroleum extraction levels, associated with a transition to a later stage of exploitation at the main oilfields and, consequently, to a decrease in extraction potentials, a reduction of oil reserves, and a worsening of their structure, began in 1976. Under these conditions all of the collective's practical efforts were subordinated to the task of maximally reducing the rate of decrease of extraction, mainly by hastening the commissioning of new reserves and improving the oilfield development procedures. In 1976-1980 60 new formations and individual small oilfields, significantly inferior to Devonian deposits in their potentials and their geological and physical parameters, were placed into production. Thus about 98 percent of the oil reserves, or practically all of the association's reserves that could be exploited by modern methods, were placed into production. A great deal of work was done to improve the exploitation system, 2,210 wells were drilled to increase the drilling density of the initial network, and an additional 1,364 wells began pumping, to include 790 exploiting selected isolated deposits. Concurrently 2,600 wells were subjected to overhaul in an effort to isolate flooding sources. The water injection volume increased in the five-year plan by 20 percent, and liquid extraction increased by 35 percent.

All of these measures made it possible to significantly increase the rate of extraction of the reserves despite a decrease in the petroleum extraction level. It should be admitted, however, that we were not concurrently able to significantly raise the effectiveness of developing difficult reserves located in combined water-oil zones, in siltstone, and in deposits of highly viscous petroleum. Due to differences in the rates of exploitation of favorable and difficult reserves, the proportion of the latter increased in comparison with the former by almost two times, and it now exceeds 53 percent. In forthcoming years the basic directions of efforts to raise the effectiveness of oilfield development will include creation of an independent system of production wells in poorly penetrable beds, lenses, and water-oil zones, use of high-pressure water (up to 25-35 MPa) where necessary, enlargement of the effort to seal off the deposits, and broader introduction of new methods for raising the oil output of the beds.

Experimental efforts in one of the sections of the Romashkinskoye oilfield demonstrated the promise of using high-pressure injected water to increase the output capacity of siltstone and to increase the rate at which petroleum is extracted from it. However, a lack of dependable equipment intended for injection of water at 25-35 MPa is preventing us from broadening the scale of this method's introduction. Reasonable results were achieved in the effort to intensify petroleum extraction from carboniferous reservoirs in tests of a method to create oil-accumulating pockets with the assistance of numerous hydrochloric acid treatments, proposed by K. B. Ashirov.

Working to improve flooding methods further, Tatar ASSR producers and scientists are directing their efforts at creating and assimilating new methods to influence productive beds permitting a significant increase in the degree of petroleum extraction. Among them, the method of *in situ* petroleum sulfation developed by the TatNIPIneft' [Tatar Scientific Research and Planning Institute of Petroleum] has enjoyed the most widespread introduction in the association. More than 140,000 tons of sulfuric acid, 6,000 tons of surfactants, and 3,500 tons of trisodium phosphate were injected into productive beds with this purpose in 1976-1980. Experiments with other methods have been started. All of this has made it possible to extract an additional 2.6 million tons of petroleum, or almost four times more than in the Ninth Five-Year Plan. By 1981, 5.6 percent of the known petroleum reserves will be exploited with the assistance of the new methods.

Much has been done. But this does not mean that all reserves have been placed into action. Practically the entire effort to raise petroleum output entails the use of conventional transportation resources and special well repair equipment not adapted to the new methods, or home-made devices to prepare and meter out the solutions of chemical reagents. Equipment being created by the Ministry of Chemical and Petroleum Machine Building to be used with the new methods does not in many cases satisfy mandatory requirements on both design on one hand and quality of manufacture and reliability on the other. Planned efforts to use sulfonates and dry polyacrylamide in petroleum extraction have not been started because these products have not been delivered yet. The association does not receive enough practical assistance from the Soyuztermneft' and Soyuzneftepromkhim scientific production associations. There are still many unresolved problems associated with the design of wells and of well and well head equipment in application to the use of thermal methods. Concurrently efforts to outfit experimental sections and the association's enterprises themselves are not

always completed on schedule. The new exploitation methods have priority significance to placing formations in the upper horizons and small oilfields into operation, since petroleum that can be extracted with the help of conventional flooding makes up only 12 percent of the total volume of the reserves not yet subjected to exploitation.

In other words the producers and scientists of the sector and of associated sectors have things to do if we are to complete the tasks posed by the 26th CPSU Congress in time. And there are many such tasks. Just in the Tatar ASSR, the applications of sulfuric acid must be doubled and the use of surfactants must be increased by eight times in the 11th Five-Year Plan. There are plans to begin implementation of large-scale projects involving the injection of liquid carbon dioxide and steam, and *in situ* combustion. All of this must insure acquisition of more than 7 million extra tons of petroleum.

Tatar oilmen intensified their attention to the use of the oil well fleet in the 10th Five-Year Plan. The proportion of mechanized extraction increased from 90 to 99 percent. More than 117,000 current repairs and overhauls were performed to keep the oil well fleet operating, computers are extensively employed to optimize the use of submersible and sucker rod pumps, and special bases repairing and servicing well and surface equipment were created. These measures increased the well use coefficient from 0.920 to 0.931 percent. An increase occurred in the time of operation of pumping wells between repairs.

Still, there are many reserves for raising the effectiveness of the use of oil, and, especially, injection wells, which represent up to 40 percent of the association's fixed capital. Due to a low shift coefficient for the current repair and overhaul teams, the time spent waiting for repairs is still great. The quantity of equipment requiring frequent repairs has not decreased significantly in the last few years; consider this in light of the fact that such equipment predetermines the quality of well and well equipment repair and maintenance in many ways. Shortcomings in the use of the well fleet, together with delays in placing well flooding under control, were among the main reasons that the Yelkhovneft', Irkenneft', and Yamashneft' petroleum and gas extraction administrations failed their five-year plans.

Efforts to automate production enjoyed further development, owing to which the association collective has already exceeded the sector average for full oilfield automation, spelled out by decisions of the 26th CPSU Congress, and for the new five-year plan it has assumed the task of using automatic meters to insure full accounting of the amount of petroleum extracted by different teams.

The association's drilling enterprises enjoyed great achievements. In two and a half years they reached their five-year target for reducing well construction time, and they provided the oilmen with 200 more wells than planned. Beginning in 1976 the drillers turned their main attention to reducing well construction time. With this purpose they developed a complex of organizational, technical, production, and economic measures insuring continuity of the construction cycle, reduction of the volume of unfinished production, and faster commissioning of wells. As a result of the measures planned for 1980, the indicators for the commercial drilling rate and the number of wells drilled per team were the highest ever. Use of new types of drill bits and tunneling machines and introduction of production scheduling cards for each drilling area made it possible to increase the average tunneling rate per

drill bit by 1.3 times. In comparison with 1975, the time of well construction was decreased from 53.2 to 35.7 days in operational drilling, and from 152 to 79.3 days in exploratory drilling. Drillers have begun to supply wells to their clients much more rhythmically. All of this resulted in additional extraction of more than 300,000 tons of petroleum during the five-year plan.

Hydraulic activation of cement solution, special buffer liquids, and physicochemical treatment of the producing zone are broadly employed as methods for raising the quality of well construction. Pressure-testing of casings has been organized at the construction bases, and practically all casings are now outfitted with standard fittings. This has made it possible to reduce, in comparison with 1975, the number of casing leaks by two times, incomplete cement injection by three times, and water penetration during well assimilation by four times, even though the complexity of the drilling areas has grown. Coordinated schedules for organizing the oilfields, building the wells, and placing them into operation were developed and introduced. As a result the employment level of the drilling teams was increased, and well idleness in anticipation of the final operations and their commissioning was reduced.

Well drilling in the Tatar ASSR will continue to be the principal means for attaining the planned oil extraction levels and improving deposit exploitation in the 11th Five-Year Plan and beyond. Complying with decisions of the 26th CPSU Congress, we worked out measures to improve the technical-economic indicators of drilling operations by introducing new production and organizational concepts, and improving the existing ones. Such improvement would require, in particular, greater use of low RPM engines in drilling, reduction of idle time and the time spent on auxiliary jobs and on handling complications, and an increase in drilling team employment time through intensification of derrick construction.

The successes of the association's collective are in many ways the product of active cooperation with scientific research and design organizations of petroleum industry and associated sectors. During the five-year plan TatNIPIneft' alone submitted 50 major developments for industrial introduction. The results of many projects completed on the basis of contracts with the association are being employed extensively in the sector. In turn, many of the valuable technical, production, and organizational concepts were borrowed by Tatar oilmen from other oil drilling regions. Conversion to the new system of planning, financing, and economic stimulation of scientific-technical progress with regard to the sector's unique features in the 11th Five-Year Plan will doubtlessly promote further growth in the technical-economic level of production.

A package of measures to improve the economic methods of production control was implemented by the association during the past five-year plan in compliance with decisions of the 25th CPSU Congress. As an example, the system for planning, evaluating, and stimulating the efforts of drilling enterprises to reduce construction time and to raise the rhythmicity of well completion has proven itself well.

Since 1 July 1979 the association has been placing the final practical touches on a new system of planning and assessment indicators, developed by the Ministry of Petroleum Industry. In the course of the system's development, the association approved indicators with which to evaluate the work of shops and other operational production units, statutes on economic stimulation, and some standards. Experience

with the new system demonstrated its positive and stimulatory role in raising the influence of economic control methods on production, and in insuring fuller, integrated evaluation of the contribution made by each collective to the end results. At the same time, the need for refining and changing certain indicators, and for solving some new organizational problems was revealed. Implementation of the new system of planning and assessment indicators and its further improvement will be an important step in intensifying the influence of the economic mechanism on raising the effectiveness of petroleum production and work quality.

Several tens of thousands of laborers, white collar workers, engineers, and technicians are toiling in the association. It is very important to constantly improve the structure of the labor collective. During the 10th Five-Year Plan the proportion of workers with a secondary education increased from 23 to 34 percent, and now one out of every five of the association's workers is an engineer or a technician. In comparison with 1975 the average qualification rank of the workers increased from 3.7 to 4.0. One out of every six of the association's workers participates in technical creativity. Savings from introducing inventions and efficiency proposals were 62 million rubles for the 10th Five-Year Plan, which is 8 million rubles more than in the Ninth Five-Year Plan.

But at the same time the low rate at which the number of manual workers is decreasing causes a certain amount of concern. If we are to solve this problem successfully, we would need to increase the availability of mechanized equipment, which in turn depends in many ways on the activities of associated ministries.

As with all laborers in the country, these days the Tatar oilmen are working in an atmosphere of high political activity to implement the decisions of the 26th CPSU Congress. The labor collectives are finding new ways to utilize production reserves and raise production effectiveness.

Continuing their policy of improving the use of the subsoil's resources, in 1981 the oilmen will increase the operational well fleet by 5 percent, and persistently improve its structure and its extraction potentials. They hope to obtain 5.2 million tons of petroleum by optimizing the operating schedules of 3,610 wells. Not less than 400 additional wells are to be connected to the gas extraction network.

The methods for intensifying the flow of petroleum to the wells and the methods for raising the injectivity of injection wells will continue to be expanded and improved. Much attention will be devoted to the well repair service--the number of current repairs and overhauls will be increased by improving their organization, upgrading their quality, reducing their average time, and increasing the time of operation of underground equipment between repairs. The oilmen are devoting serious attention to raising the reliability and life of equipment, and to increasing the operating stability of production facilities in extreme weather conditions.

Tatar oilmen have a large amount of experience in organizing socialist competition. Many valuable initiatives came into being here; special mention should be made of the experience of drilling foreman D. M. Nurutdinov of the Al'met'yevsk Drilling Administration under the slogan "Get those oil wells flowing", which was extensively publicized in the sector. The association's collective places a high value on the labor valor of its best teams, led by foremen A. G. Abdullin, M. S. Agiyamov,

A. S. Baklanov, N. Kh. Valeyev, S. S. Gataullin, M. P. Grin, V. N. Zhandayev, D. M. Nurutdinov, V. M. Petrosenko, V. M. Ryabashev, Kh. S. Suleymanov, G. M. Khaziyev, G. Kh. Khusainov, and many others who were the first to report attainment of the targets of the 10th Five-Year Plan ahead of schedule. Their achievements are helping to reveal new reserves and possibilities in the equipment, the production processes, and production organisation; this is why further development of new forms of competition, and support of new initiatives will enjoy an important place in the association's work.

In the new year, the Tatar oilfields will reach their second billion ton mark in petroleum extraction since the republic's oilfields were first developed.

A competition to reach this important mark has been started in the association's collective, and it is encouraging further efforts in attainment of the collective's targets.

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YUGANSKNEFTEGAZ CONTRIBUTES TO DEVELOPMENT OF OIL EXTRACTION IN WEST SIBERIA

Moscow NEFTYANOYE KHOZYAYSTVO in Russian No 3, Mar 81 pp 5-8

[Article by R. I. Kuzovatkin, general director, Yugansknefteqaz Association]

[Text] The Yugansknefteqaz Production Association of Glavtyumenneftegaz [not further identified] is a part of the West Siberian fuel and energy complex, to the development of which the party and government attach extremely important significance. The association produces about a sixth of all petroleum in West Siberia. The rate at which production grew in the past five-year plan can be judged from the fact that the association's petroleum extraction volume increased by 83 percent, and utilization of petroleum gas grew by 2.5 times. Almost 1.5 billion rubles were invested into the region's development, facilities capable of collecting and preparing 36.2 million tons of petroleum per year were built, and 3,750 km of oil and gas pipes, 855 km of power transmission lines, and 161 km of motor highways were placed into operation. Three NGDU's [petroleum and gas extraction administrations] within the association's composition are extracting more than 130,000 tons of petroleum and 3 million cubic meters of petroleum gas every day. The association's drilling enterprises are constantly increasing their well drilling volume--in the last 3 years it increased by 27-38 percent annually.

The association's collective was one of the initiators of the socialist competition in the sector for a worthy welcome to the 26th CPSU Congress, and it satisfied its pledges fully. Attainment of the 10th Five-Year Plan's drilling target ahead of schedule played a special role in this. This achievement was due to the meticulous and persistent effort to introduce integrated production and organizational measures aimed at raising the effectiveness of drilling operations. The measures were diversified in nature, and what is most important is that they considered the advanced skills of the association's drilling teams and of teams belonging to other associations in West Siberia. As an example the experience of the Surgut Drilling Administration No 2 in jet bore pit drilling made it possible to reduce the time for this operation from 6 hours down to several minutes; meticulous analysis of the drilling of geologic exploratory wells made it possible to select the most sensible range of drill bits.

The association's production engineering services are doing a great deal of work. They have developed and introduced production standards and regulations, and typical planning concepts for each stage of drilling operations; they have introduced a single recipe for preparing lightened drilling solutions, treated by the

by the most effective reagents, to be used by all teams. These solutions insure the high quality of slant holes with the bottom hole 1,000 meters away and farther. Use of modernized vibrating screens and silt separators significantly improved the cleaning of drilling solutions.

Successive implementation of a complex of measures helped the association's drillers to raise mechanical drilling speed from 30 to 32.3 meters per hour and the distance tunneled from 181.7 to 187.6 meters per drill bit in just the last year of the 10th Five-Year Plan. In this case the commercial rate increased by 27.7 percent, well construction time decreased from 44.1 to 44.3 days, and the productive time of drilling reached 72.8 percent. Owing to this the average tunneling distance grew from 32,100 to 38,300 meters per year per team. It stands to reason that these indicators were the result of more than just introducing new equipment and production innovations; this was mainly the result of the work and the creativity of the drilling teams. The sector is well aware of the experience of Kuybyshev foreman I. G. Feklov, who provided help to team collectives having trouble in fulfilling their plans and pledges; this experience was successfully utilized by progressive Yuganets teams led by A. A. Gorkovenko, M. V. Politov, A. V. Slyunin, Yu. T. Boyko, F. D. Gabdullin, and A. P. Tychinin. They assumed sponsorship of expeditionary teams that were suffering low work indicators owing to the novelty of the geological conditions in which they had to operate.

Significant attention was devoted to reducing well construction time with emphasis on derrick assembly. Specialized teams assembling the new 3000 EUK drilling rigs intended for cluster drilling were created for this purpose. Transportation and special equipment were permanently assigned to the teams, and the wages of the transport workers were made dependent on the work results of the integrated teams. A socialist competition based on the team relay method was organized among the collaborating teams. As a result the cluster drilling rig assembly time was reduced by 4.5 days, and the time required to move rigs within the cluster drilling area was decreased by 41 percent. Owing to a story-by-story assembly procedure developed by the association's specialists, it now takes only 45 minutes to move a rig to a new point within the cluster drilling area.

Satisfaction of the pledges adopted by the association's collective in relation to oil and gas extraction promoted faster introduction of new wells, improvement of the existing wells, and full implementation of engineering concepts intended to improve the reservoir pressure maintenance systems. Another target was to implement a major complex of organizational and technical measures, to include commissioning new wells ahead of schedule, converting operating wells to more-productive mechanized exploitation methods, starting up inactive and moth-balled wells, optimizing the well exploitation conditions, intensifying the oil flow, and so on. Within the limits of a single article, it would be difficult to illuminate the entire diversity of measures implemented to place the oil extraction reserves into action. We should note that the association's collective has done a great deal of work, displaying true labor creativity and bold production initiative, and that it honorably fulfilled the socialist pledges it adopted in honor of the 26th CPSU Congress.

However, the production reserves are far from exhausted. It would be sufficient to mention the use of equipment and mechanisms below their full capacity by certain subdivisions, the cases of waste in the work of drillers and in well overhaul and repairs, the poor organization of labor in some shops and teams, and so on. Thus

the priority task of the association's collective today includes revealing and fully evaluating these reserves, such that measures to implement the "Basic Directions of the USSR's Economic and Social Development in 1981-1985 and in the Period to 1990", approved by the 26th CPSU Congress, could be consistently and effectively completed.

The important document cited above imposes an immediate task upon the oilmen--raising the rate of development of petroleum extraction industry in West Siberia. All efforts of the association's collective must be directed at completing this task.

First of all we thoroughly studied the possibilities for increasing our contribution to growth of petroleum extraction in West Siberia, we discussed them in the shops and teams, and we supported them with calculations. The first thing we need to do is insure the association's stable operation in 1981--the first year of the new five-year plan--and thus create a dependable foundation for work in subsequent years.

Jointly with workers of the NGDU, the association's specialists, when developing concrete technical and organizational measures, tried to take the fullest account of changes that may occur in the conditions under which wells and production equipment will have to operate in future years. In particular they considered the fact that the water content of well yields will increase by an average of 31 to 35 percent just in 1981 alone, and that the average output of new wells and of wells undergoing conversion will decrease somewhat in comparison with last year. Consequently special attention will have to be devoted to making the most effective use of the well fleet; this is the idea that assumed the forefront in the measures we developed.

Thus we plan to make 160 more new oil wells operational than last year by increasing the exploitational drilling volume by 13 percent. Concurrently by accelerating the commissioning of new wells, the number of days of work of each new well will be increased from 140.1 to 160 days on the average. This target is realistic, since in 1980 the number of days of work of a new well was increased from 101.6 to 141.1 on the average.

We plan to reduce the number of inactive wells by 1.5 percent. By placing 23 such wells of the association into operation, we will increase oil extraction by 105,000 tons; we cannot ignore such a reserve, despite the amount of work it will take to start up inactive wells again.

The most significant reserve of petroleum extraction is conversion of wells to mechanized operation, predominantly with centrifugal submersible electric pumps (ETsN's). This will mainly affect old gushers, the yield of which in later stages of exploitation is significantly lower than their potential productivity. About 360 such wells will be affected in 1981, which will provide up to 900,000 tons of petroleum for the association.

Decisions of the 26th CPSU Congress foresee introducing a progressive means of gas-lift exploitation and highly productive submersible electric pumps. Consequently conversion of wells operating on the basis of unproductive exploitation methods to highly productive methods would be in full correspondence with party directives. However, if we are to achieve such a conversion we would need the help of the machine builders producing ETsN's. In this case the oilmen of West Siberia need not only more of such devices, but also ones of greater reliability.

The experience of previous years has shown that optimizing the operating conditions of mechanized wells with the assistance of computers produces a good result. Continuing this practice, the association's oilmen hope to obtain 170,000 tons of petroleum in 1981 by optimizing the operating conditions. They must also expand the efforts and methods of getting more oil to the wells. Just in 1981 alone, this would provide the association with a yield increment of 105,000 tons, and treatment of the critical zone of injection wells will increase the amount of water pumped into the beds by 1.5 million cubic meters per year, and increase the flow of oil to wells located in areas of the formation enjoying poorer drainage conditions.

In their effort to improve the use of the well fleet, Yuganskneftegaz oilmen attach great significance to improving the organization and quality of repairs made on the wells. What is needed here is a package of measures. First of all we need to increase the average number of operating teams in 1981 from 23.7 to 28 in well overhaul, from 29.4 to 33.7 in current repairs, and from 6 to 12.3 in preparatory operations. This is needed because 735 new wells will go into operation, and the number of repairs to be made will be increased by 16-17 percent. However, it would not be enough to simply increase the number of teams. We must also significantly improve the work indicators of the repair team: The shift coefficient of the repair teams will have to be increased, and the average time of current repairs and overhauls and the cost of well repairs will have to be reduced. What we need is the daily attention and, mainly, the creative initiative of the repair teams themselves. Thus V. Zadorozhnyy's team, which pledged to complete 7.5 annual targets by the beginning of the 10th Five-Year Plan, initiated a precongress socialist competition in current well repairs under the slogan "A worker's guarantee of quality well repairs". The collective kept to its word, attesting to the great possibilities available for improving the work of all teams.

Special attention should be turned to increasing the time of well operation in the period between repairs; this pertains primarily to facilities equipped with ETsN's. Because of the unsatisfactory quality of the supplied equipment, additional repairs must be made in 7.6 percent of the cases. This could be avoided by imposing stiffer controls over the quality of equipment being supplied to the oilfields, and by promptly notifying the manufacturer of any problems arising. However, many of the additional repairs must be made at the fault of the repair teams themselves. More than half of the current well repairs in the association are performed in response to inspections of these rigs; thus eliminating the need for additional repairs to make up for the mistakes of the repairmen themselves has great significance. There are significant reserves in reducing the time of well overhaul and raising its quality.

Implementing the association's measures to raise the reliability and life of underground and surface oil drilling equipment and production facilities also has a direct relationship to raising the time of well operation between repairs. These measures include preventing and controlling corrosion, preventing deposition of salts and paraffin, and insuring stable operation of the equipment in the presence of low temperatures and extreme weather conditions. The NGDU's collectives already have a certain amount of experience in this area, but they must also study and utilize the experience of other associations.

A significant effort is to be made to improve the quality of petroleum preparation and to reduce demulsifier consumption. The volume of untreated petroleum supplied will be reduced by 3.3 times. As before, the association's collective will actively introduce new equipment and advanced procedures, it will fully automate production operations, and it will raise labor mechanization.

Much attention will be devoted in 1981 and in subsequent years to improving the use of natural gas. This year the association must insure attainment of the full output capacities of the Yuzhno-Balykskiy and Pravdinsk natural gas plants and the Zapadno-Surgutskaya compressor station. The association's drilling organizations have also written up measures in support of their work in the 11th Five-Year Plan. In addition to achieving maximum use of the internal reserves, they intend to apply new technical resources and production concepts, to reduce the idleness time of drilling teams, to prevent mishaps and waste, to decrease repair time, to shorten the period of well completion, and so on.

Full utilization of capital investments to fit out the oilfields, to develop oil extraction methods further, and to improve the power and water supply systems and the motor highways is an indispensable prerequisite of insuring the association's success. Moreover the task of making full use of investments into housing, social, and cultural construction is being considered.

The association will continue to devote a great deal of attention to organizing and leading the socialist competition. Time-tested forms of competition will be placed to extensive use for the first time. These forms include attaining maximum annual output in each well current repair and overhaul team, competition among collaborating teams participating in the construction and outfitting of cluster wells according to the team relay principle, and the competition for the title "Best Team in the Profession".

In addition to this, the association is developing team forms of labor organization, many collectives are switching to the team and group contract system, and the system of planning and evaluation indicators to be used in material stimulation of end results is undergoing improvement.

The association's collective has joined the effort to fulfill the decisions of the 26th CPSU Congress, and it is directing all of its efforts at completing the complex, difficult tasks of the 11th Five-Year Plan, raising production effectiveness in every possible way and utilizing internal reserves for this purpose.

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PROSPECTS FOR NEW PETROLEUM RESOURCES IN EMBA OIL REGION DESCRIBED

Moscow NEFTYANOYE KHOZYAYSTVO in Russian No 3, Mar 81 pp 8-10

[Article by Embaneft' Association General Director B. S. Sagingaliyev, V. P. Avrov, and M. B. Balgimbayev]

[Text] The important task of expanding geological explorations for petroleum and gas in western Kazakhstan was directly reflected in the "Basic Directions of the USSR's Economic and Social Development in 1981-1985 and in the Period to 1990". In this connection this article presents the prospects for finding new petroleum resources and developing petroleum extraction on this basis within the territory assigned to the Embaneft' Association.

The Emba oil-bearing region, one of the oldest, is located in the southeastern part of the Caspian depression. One unique geological feature of the region is the presence of numerous salt domes, with the apexes of which the principal revealed oilfields are associated. In most cases the oil-bearing area of formations usually associated with Jurassic and chalk deposits is a small proportion, equal to 10-20 percent of the area of salt dome caps, riddled by numerous faults. These unique features of the structure of the formations make their exploration difficult, and promise scanty reserves. Industrial development of the territory has necessitated significant capital investments into exploratory operations and into development of the revealed accumulations of oil. The dispersal of the oilfields (some of them are located more than 500 km apart) has hindered the collection and transportation of oil. However, despite these difficulties oil extraction is constantly increasing in the Emba region, with most of the growth (more than 35 percent) having occurred in the last 10 years.

New prospects for finding petroleum have recently opened up in the area of activities of the Embaneft' Association. The new fields will increase the petroleum extraction rate by several times. This was the result of improvements in the techniques of geological exploration--primarily deep exploratory drilling and seismic analysis, which have created real possibilities for developing deep reserves. The forecasted estimate of the oil content of sub-salt horizons (down to 5 km) in the Emba region exceeds by several times the oil content of sub-salt chalk and Jurassic deposits that have already been explored, and it represents a significant part of the petroleum resources of the Caspian depression. This has made the Emba region one of the priority targets in the search for petroleum in the Caspian depression, the development of which was foreseen by decisions of the 25th CPSU Congress. In order to implement

these decisions the Ministry of Petroleum Industry created special subdivisions in the Embaneft' Association to explore the territory assigned to the association. The Kalykshinskoye Exploratory Drilling Administration, the Prikaspiyskoye Drilling Administration, well plugging and derrick assembly offices, and a research group generalizing the results of geological explorations have started operating, and drilling teams have been called in from the Nizhnevolzhskneft' Association.

In order to accelerate the preparations for deep drilling, the Embaneftegeofizika Trust was created and seismic field parties were called in from the Saratovneftegeofizika, Krasnodarneftegeofizika, and other trusts.

Owing to these measures several formations were discovered in the sub-salt complex contiguous with the areas undergoing development (Zapadnaya Prorva, Novnoye, Imashevskoye-Makatovskaya, Zapadnyy Donor, Vostochnaya Kokarna), and development of some of them made it possible to not only stabilize but also increase the petroleum extraction level in the 10th Five-Year Plan. However, establishment of the petroleum and gas content of sub-salt deposits along the South Emba was one of the most important results of the explorations.

The volume of explorations being conducted in the Caspian depression by the Kazakh SSR Ministry of Geology was also increased, owing to which petroleum was discovered in sub-salt deposits at the Kenkiyak oilfield, at the Shanashol, Sinel'nikovskoye, and Shul'kra exploratory fields, and elsewhere. Thus just the modest explorations of sub-salt deposits conducted in recent years have revealed favorable geological prerequisites for finding oil deposits within them. The reserves of one such deposit could exceed the total reserves of all oil accumulations formerly revealed in the strata above the salt dome. Exploration of sub-salt deposits initiates a qualitatively new stage in development of the Emba region's oil resources, and it has decisive significance to creating a new raw material base in western Kazakhstan and to sharply increasing petroleum extraction in that area.

When we examine sub-salt deposits within a broad stratigraphic range (from lower Permian to Devonian inclusively), we find several regional oil-bearing strata. Judging from the established features of the geological structure and the oil-bearing nature of the territory, presence of extensive oil accumulations is expected along the entire southeastern margin of the Caspian depression, to include regions along the North and South Emba. The revealed accumulations of petroleum are dispersed in numerous strata, and they cover a significant area. Thus five lower Permian productive horizons were encountered just in the terrigenous complex within the 500 meter cross section of the sub-salt stratum of the Kenkiyak oilfield (3,613-4,313 meters). Oil has also been discovered in lower-lying carboniferous coal deposits distributed within a broad strip of the Kenkiyak-Koshasayskaya bench. Commercial accumulations of oil were also revealed in carboniferous rock of the Shanashol-Sinel'nikovskaya bench at 3,000-3,700 meters. Moreover this raised strip of promising sub-salt carboniferous rock also extends south (300 km and more) into the Tortkul'skoye and Shul'krinskaya oilfields. A tentative assessment of the possible commercial oil reserves in the Kenkiyak and Shanashol-Sinel'nikovskaya sub-salt structures showed that these reserves may be increased by several times in this region.

Significant commercial oil deposits were found along the South Emba and within the limits of the Tengiz sub-salt rise. A high-yield oil gusher was discovered here in the apex of a vast (20×20 km) high-amplitude rise, the dimensions of which were determined not only by seismic operations but also through deep drilling data. The oil is light, its sulfur content is low, and the gas factor is negligible; however, up to 8 percent hydrogen sulfide is contained in dissolved gas. Presence of hydrogen sulfide has been noted in almost all oil samples obtained from sub-salt carboniferous rock from the southeastern part of the Caspian depression. Thus oil from the Zhanazhol field had a hydrogen sulfide concentration of about 2 percent, while oil from the Tashigali field had a concentration on the order of 17 percent. There are indirect indications that hydrogen sulfide may be present in oil of the Severnyy Kultuk and Yuzhnoye fields. Such broad variation in the content of the products of exploratory wells requires that in each concrete case, in the first tests we orient ourselves on the stiffest corrosion conditions; this significantly retards the rate and reduces the scope of the exploratory operations. However, the domestic and world experience in exploring and developing such oilfields indicates that these difficulties are fully surmountable. This is true all the more so because we have anti-corrosion equipment intended for the exploration and development of gas deposits characterized by a high hydrogen sulfide concentration. Therefore the main task today is to provide such equipment quickly to all deep wells to be drilled.

The geological features of the region's cross section are suited to highly effective use of drilling equipment in the drilling of deep wells. Thus presence of diapiric formations above the salt domes permits us to select well sites in places where two-thirds of the cross section consists of easy-drilling salt-bearing rock. For this reason the rate of drilling exploratory wells on sub-salt deposits 4,500 meters deep attains 650 meters per standard month in some teams. However, by correctly solving organizational problems and supplying the equipment required, we could significantly increase the drilling rate, and thus dramatically increase the pace of exploratory operations.

There is a real possibility for quickly augmenting the commercial oil reserves in the Emba region because their anticipated locations are in areas that have already been developed. As an example presence of the Shevchenko-Gur'yev-Kuybyshev main oil pipeline in the region basically solves the oil exportation problem completely. Economic calculations demonstrated that all capital investments associated with exploring the oil reserves in the sub-salt deposits could be compensated in 3-5 years. The calculations were based in this case on the discovery of just one formation containing reserves that cannot be doubted today. At the same time, the general geological data suggest that within the limits of the territory allocated to the Embaneft' Association, there is a real possibility for revealing several such formations along the North and South Emba. Moreover each of these formations would be in direct proximity to a developed producing oilfield. The natural landscape will be highly favorable to developing the new formations in the region.

Because there is a real future to creating a sizeable crude oil extraction base in direct proximity to the European USSR, we must begin encouraging organizations of the Ministry of Construction of Petroleum and Gas Industry Enterprises to work in these regions right now. The activities of such organizations, when organized according to the shift method practiced in deep drilling, would promote quick

development of the oilfields, and development of centralized housing construction in the city of Gur'yev would make attraction of highly skilled specialists--drillers and producers--to the Emba region possible. However, if Emba oilmen are to reach their long-range targets, they will first of all have to dramatically intensify the exploratory operations, turning special attention to their qualitative aspects. An analysis of unfavorable results of drilling in sub-salt deposits revealed inconsistencies between the organizational and, to some extent, the technical level of well drilling, and the production problems that must be solved in the conditions of the Emba region during exploration and prospecting of the oil formations. But the technical level of well drilling and testing that has been achieved allows us to confidently solve the problems of developing the sub-salt deposits. Therefore we must devote special attention to providing equipment that corresponds fully to the geological conditions under which well drilling and testing must proceed.

The Emba region must become an important target of exploratory operations in western Kazhakstan and in all of the Caspian region during the 11th and 12th five-year plans; this is why Emba oilmen are ready to apply maximum effort to achieve a significant increase in the commercial oil reserves, and to increase oil extraction.

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LACK OF HIGH-LEVEL COORDINATION FRUSTRATES GAS PIPELINE LAYING EFFORT

Moscow SOVETSKAYA ROSSIYA in Russian 11 Feb 81 pp 1-2

[Article by V. Avdevich: "The Ups and Downs of the Route"]

[Text] Last year the country extracted more than 435 billion cubic meters of gas--a time and a half more than in 1975. A branched pipeline transportation system is being created in order to deliver the raw material and fuel to places of consumption. Raising the reliability of gas supply is an important state task. What progress is being made?

Scarcity in the Face of Abundance

Last year "Tyumengazprom" drillers took almost 50 billion cubic meters of gas from the subsoil of the Urengoyskoye gas field--5.2 billion more than planned. One would think that consumers would have no complaints against the producers. But many alarm signals are being sent from numerous oblasts supplied with Urengoyskoye gas. Why? Ten billion cubic meters of fuel failed to be delivered as planned. And the situation has still not changed today.

"We are extremely concerned by the interruptions in the supply of gas to the sector's enterprises," said A. Petrakovskiy, a department chief at the USSR Ministry of Ferrous Metallurgy. "The plants in Krivoy Rog, Makeyevka, and Kommunar are breaking their rhythm. As an example the Novolipetsk Metallurgical Plant will be undersupplied 35 million cubic meters of blue fuel in the first quarter. This means that less pig iron will be smelted here, and 28,000 tons more coke than necessary will be expended."

"Our production operations located in the country's central oblasts continue to be supplied with gas unsatisfactorily," reports N. Tikhonov, a department chief of the Ministry of Chemical Industry. "The Berezniki Nitrogen Fertilizer Plant, the 'Kuybyshevazot' Production Association, and the Gorlovka 'Stirol' Production Association are on 'starvation rations'. For this reason the national economy will fail to receive thousands of tons of mineral fertilizers and other chemical products on time."

And so, on one hand the Urengoyskoye gas producers are surpassing their plans, and on the other hand their shockwork has not reached the end goal--satisfying the needs

of consumers. The problem is that the carrying capacity of pipelines extending from Urengoy to the center of the country is much below their rated capacity. In many places the gas flow drops. How do these "bottlenecks" form?

Take as an example the Urengoy-Chelyabinsk-Petrovsk-Novopskov main pipeline. It is supposed to carry 56 billion cubic meters of gas per year from the gas fields to Chelyabinsk, and 32 billion cubic meters from Chelyabinsk to Petrovsk. In fact, however, the pipeline carries much less. Why these ups and downs?

"A modern underground gas main consists of several channels," explains First Deputy Minister of Gas Industry V. Dinkov. "In order that the gas would travel uniformly, and in the volume foreseen by the plan, all of the pipes must be laid. The department's builders often forget this important prerequisite. In many sections of the route, we still do not have second sets of pipes, and back-up river crossings. A total of more than 1,500 kilometers of pipeline were not laid on time on the Urengoy-Chelyabinsk-Petrovsk-Novopskov-Yelets route. And of course, the gas flow has been unable to reach its peak."

There is more. The gas does not flow through the main by gravity. It is pushed along by powerful compressor facilities. Their commissioning is significantly behind. As an example shops servicing the second set of pipes of the Urengoy-Chelyabinsk gas pipeline have not been built yet at the Priobskaya and Dem'yanskaya compressor stations. And the Polyanskaya and Algasovskaya stations, which are being erected in the Chelyabinsk-Petrovsk-Yelets section, were not put into operation on time. Moreover, not all of the machine units have been started up yet even at facilities that are already operating. According to figures of the Ministry of Gas Industry, only 68 percent of the 2.7 million kw of the planned output capacities are ready. The consequences? Each day the consumer finds himself short tens of millions of cubic meters of blue fuel.

The extracted gas must thus be used by Ural and Siberian enterprises that could be fully satisfied with Kuznetsk and Ekibastuz coal. According to the designs of the USSR Gosplan, the underground gas mains must provide raw material and fuel to industry and cities in the central oblasts. But the poor work of the Urengoy-Chelyabinsk-Petrovsk-Novopskov pipeline has foiled this strategic design. And in some cases gas must be substituted by coal from the Kuznetsk Basin in the European part of the country, tying up tens of thousands of rail cars per year for these unplanned shipments.

This is the essence of the problem. The state spends enormous assets to extract gas and to erect underground main pipelines for its transportation. The producers are surpassing their targets. And nevertheless the product extracted from the subsoil is failing to reach its destination in its entirety. Who is to blame for this? The point of view of the Ministry of Gas Industry is already known: The exploiters lay their responsibility upon their partners--subdivisions of the Ministry of Construction of Petroleum and Gas Industry Enterprises. But what do they think about this in the general contracting department?

Deceptive Statistics

The obvious facts are not denied by Deputy Minister G. Arendt, Main Production Management Administration Chief A. Krayzel'man, and Sector Gas Industry Administration Deputy Chief A. Dertsakyan. Yes, they admit, the exploiters do have substantial grounds for their complaints. But this is also a two-way street. The Ministry of Gas Industry often delays deliveries of complementary equipment, and it is not publishing its planning documents on time. For example the builders have still not received technical documents from their client to erect the compressor station in Volokolamsk and for the Yelets-Kursk gas pipeline.

The difficulties are aggravated by the fact that the orders submitted by the builders to USSR Gosplan and Gossnab for bulldozers, pipelayers, and excavators are not being fully satisfied. We would have to agree, executives of the Ministry of Construction of Petroleum and Gas Industry Enterprises argued, that normal work and completion of the gas pipelines on time would hardly be possible under such conditions. What needs to be done to eliminate the shortcomings?

"Our ministry specializes in erection of facilities for two sectors with production features that are similar in many ways--the gas and petroleum sectors," said A. Krayzel'man. "This creates especially favorable conditions for surrendering pipelines and pumping stations to clients fully ready to go. We are prepared to assume the responsibilities of planning, equipment supply, and construction. In our opinion such centralization would significantly hasten creation of new gas and oil pipelines."

This proposal doubtlessly deserves attentive study. But at the same time just an organizational change, I feel, would not be enough to orient the builders in the proper direction--achieving the end result required by the national economy. We also need to use economic levers. Let us return to the explanations given by executives of the Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises]. Let us recall their principal arguments: Late arrival of blueprints and complementary equipment is one of the main causes of the delay in achieving the full capacity of gas pipelines. Now let us look at the statistics. Despite all difficulties, each year the Minneftegazstroy has surpassed the plan for construction and installation at facilities of the Mingazprom [Ministry of Gas Industry] each year for the last 3 years. But the program for starting up these facilities was perpetually not met. Last year, for example, the construction plan was surpassed by 11 percent, but 2,000 kilometers of gas pipelines and 27 compressor stations were not put into operation.

Thus we find that contracting organizations of the Minneftegazstroy, using the failures of their client as a cover, "fulfilled" their construction and installation plan by finishing financially profitable jobs first. The order of accounting and stimulation promoted this: The more pipes buried in the ground, the greater the volume of assimilated capital investments and, consequently, the larger the absolute dimensions of the wage and bonus funds. But as a consequence laborious operations such a laying pipelines (second sets) across rivers, assembly of auxiliary and service buildings, erection of water supply facilities, and so on, without which compressor stations cannot operate effectively, are given second priority. Millions of rubles have been spent, but rather than an abundant river of gas, we see only a trickle through the underground gas mains. Looking at the big picture, surpassing a plan for assimilation of assets, if it does not lead to the end result needed by the national economy, is nothing more than the waste of state assets.

This practice has now been overcome. The CPSU Central Committee and USSR Council of Ministers decree on improving the economic mechanism foresees different criteria and stimuli for the activities of construction organizations. This year they are to finish their transition to a new form of accounts between client and contractor: Payments will now be made for facilities that are fully completed and accepted for operation, on the basis of the estimated cost of commercial construction. The practice of paying advances to contracting organizations for unfinished construction and installation will be halted. Such outlays will have to be covered by bank loans until the facilities are surrendered to the client.

The advantages of this form of business relations are obvious from the point of view of the national economy. With the new order, the Minneftegazstroy will no longer be rewarded for surpassing the plan for construction and installation without fully completing the start-up program, and the previous approach will simply become unprofitable. The newly adopted form of accounts requires considerable efficiency on the part of the client as well--the Mingazprom. The builders will no longer include facilities in their construction plan if the planning and estimate documents for them are not received prior to July of the previous year, as is now required. This orientation on the end result must become the economic basis for mutual relationships between builders and operators at all levels of administration--from the ministries to the gas routes themselves.

However, it would be incorrect to blame all of the shortcomings on imperfections in the system of mutual accounts. If we admit that contracting organizations were unable to rise above their bureaucratic interests and approach their work from the position of the state's interests, there are organs that were supposed to have helped them. The known ease with which the Ministry of Construction of Petroleum and Gas Industry Enterprises surpassed the plans for construction and installation of gas pipelines each year causes one to think. One hundred eleven percent--that is a good indicator for a team and a section, and an outstanding indicator for a collective on the average. But when an entire sector exceeds its target by 11 percent, one begins to wonder if its burden is not too light. The time of Minneftegazstroy growing pains has already passed. It is now standing firmly on its feet, and it is obviously capable of more. And yet the USSR Gosplan approves volumes of construction and installation for the ministry that are noticeably behind the rate of growth in gas extraction. And so a problem is created.

Such an imbalance is especially intolerable in light of the tasks of the 11th Five-Year Plan. By 1985 the volume of blue fuel extracted will have to be increased to 600-640 billion cubic meters--that is, by 40-45 percent. There are plans to raise the effectiveness and reliability of the country's unified gas supply system. The load carried by the builders of the underground gas mains will grow dramatically. Each year they will need to lay gas lines more than 5,000 kilometers long (using pipes having a diameter of 1,420 mm)--that is, a time and a half more than, for example, last year. This forced pace can be achieved only if obsolete methods for planning, evaluating, and stimulating the work of Minneftegazstroy's enterprises are decisively rejected, and if the collectives are oriented at achieving the end results.

The draft Basic Directions contain the following phrase: "Erect high-capacity main gas pipelines characterized by a high degree of automation and operational reliability." The capacities of machine building for the production of gas pipeline laying equipment has recently been developing at an accelerated pace. Deliveries of domestic equipment grew dramatically in the 10th Five-Year Plan.

The CPSU Central Committee's draft report orients the machine building ministries on series production of new gas pumping units of higher capacity. What is essentially being required is elevation of the entire sector to a new technical level, one in keeping with our economy's present potentials.

The models of such equipment have already been created. In terms of their operating qualities they are superior to foreign articles of similar type. As an example the new GPU-10 gas pumping units are productive and compact. It takes only half the time to build the shops to house them. But designers have created even more-effective equipment. The time has now come to hasten delivery of this equipment to the routes under construction. However, far from everything is being done to support this effort.

No Farther Than the Model

In its time, the Ministry of Power Machine Building was ordered to manufacture experimental models of gas pumping units with output capacities of 16,000 and 25,000 kw, and, in 1977-1978, to place the machine units into series production. The ministry issued an order obligating Ural'sk Turbomotor Plant Director P. Lunenkov and Nevskiy Machine Building Plant Director G. Velikanov to complete the assignment on schedule. What happened next?

"The experimental models," reports Deputy Minister of Power Machine Building Yu. Kotov,"were manufactured on time, but they could not be placed into series production because the Mingazprom and the Minneftegazstroy delayed erection of test benches at the compressor stations in Novgorod and Syaert' (near Sverdlovsk)."

The deputy minister was not entirely accurate. Although there was a delay, the test benches were accepted for operation 2 years ago. Nevertheless the experimental models have still not made it to the series production stage. V. Goloviznin, chief of the Technical Administration of the Ministry of Power Machine Building, points his finger at the USSR Gosplan, which allegedly provided no assistance in obtaining the necessary production equipment and failed to allocate capital investments for the development of production capacities at the Nevskiy Machine Building Plant.

"Nothing of the sort," declared M. Letovaytsev, a subdivision chief of the USSR Gosplan. "First, no special equipment is needed for series production of the new units, and secondly, a certain part of the assets allocated to the Ministry of Power Machine Building could quite well have been channeled into the development of the Nevskiy Plant."

As we can see, by citing "objective" causes Yu. Kotov and V. Goloviznin tried to explain away the failures and mistakes in the areas of work for which they are responsible. Five times last year the governing board of the ministry concerned itself with models of the new gas pumping units during discussions of problems associated with introduction of new equipment. But nothing ever went farther than the models. Are the executives of the Ministry of Power Machine Building really not concerned about the weakness of their own decisions? A number of new machine units were written into the plan of the USSR State Committee for Science and Technology and into documents of the USSR Gosplan. Apparently even these

authoritative agencies were not especially strict in monitoring the executors. Equipment that is ready for practical purposes should be placed into operation faster.

I would also like to turn the reader's attention to another aspect of the problem. If assimilation and production of new machines proceeds successfully, the creators of the machines recieve material rewards. In the opposite situation, however, no one as a rule bears liability, neither administrative nor tangible material. Deserving of attention in this connection is the example of electrical engineering industry, in which work is stimulated as an integrated start-to-finish system--from the model to series production. Creation of a similar economic mechanism at the intersector level is persistently demanded by practice. Cooperation among several ministries in the preparation of progressive machines and equipment must be based on a common economic interest. For the moment it does not exist, and bureaucratic limitations are difficult to surmount. Here is another example.

Were gas pipelines to be laid on the route with insulation already applied at the plant, we could free about 350 workers, almost 90 heavy crane pipelayers, and more than 40 cleaning and insulating machines for every thousand kilometers of the route. The rate of the final construction operations would be doubled as well. On the whole, use of such pipes would produce a savings of about 10,000 rubles per kilometer. It would not be difficult to imagine the benefit the state may enjoy, considering the scale of construction the underground routes require.

The USSR Ministry of Ferrous Metallurgy has handed down several assignments to organize production of large-diameter pipes with an insulating polymer coating. The last such assignments, dated 1977, indicated specifically that such pipes were to be produced by the Volzhsk, Khartsyzsk, and Novomoskovsk piping plants and the Chelyabinsk Tube-Rolling Mill. USSR First Deputy Minister of Ferrous Metallurgy had these causes on the tip of his tongue: The necessary equipment did not arrive on time, the Ministry of Heavy and Transport Machine Building was late in placing new output capacities into operation, and the Ministry of Chemical Industry failed to supply epoxy resin of the required quality.

What we find in general is that the blame lies with all departments except the USSR Ministry of Ferrous Metallurgy, which is directly responsible for this new effort, one extremely important to the national economy. "Objective" causes are very convenient when the time comes for finding justifications for all sorts of failures. We have often heard about the "psychological barrier" which cannot be surmounted in any way by executives who have become accustomed to dealing only with pure rolled metal, and not with polymer chemistry. It stands to reason that it is not a simple thing to organize a unique chemical production operation at a metallurgical enterprise. There are many problems associated with this, and the economic payoff goes to other sectors--the builders and operators of the gas mains. Could this be why the USSR Ministry of Ferrous Metallurgy, and the Ministry of Power Machine Building, have been more successful in finding excuses than completing their important state assignment?

That which is profitable to the national economy should also be profitable to every department, to every enterprise. Such is the essence of the economic mechanism. However, we should not forget planning discipline, which will at times not be in

keeping with departmental interests. Wherever the work is approached from the standpoint of state interests, the goals are reached despite all objective and subjective difficulties. As an example the Volzhsk Piping Plant did manage to build an experimental industrial unit and produce 50,000 tons of piping coated with epoxy paint. It is a pity that the plants in Khartsyzsk, Novomoskovsk, and Chelyabinsk did not follow the example of the Volzhsk workers. Nor did the USSR Ministry of Ferrous Metallurgy adequately support the enthusiasts. As a consequence the sector failed its assignment for production of piping with insulating polymer coatings in this five-year plan as well.

"All of our decisions," said Comrade L. I. Brezhnev, "must be supported by well-conceived, effectively organized measures. What must be done where and when, who is specifically responsible for the given area of the work, and who--once again specifically--monitors execution. Each unit of the administrative machinery must clearly envision its role and place in solving the most important economic problems."

Today, when the country must attain larger and more-complex goals, raising personal responsibility of business executives and maintaining clearer and more effective control over execution of adopted decisions are acquiring especially important significance.

The successes and the heroic labor of the creators of the gas routes are highly valued by the country, and rightfully so. But analysis would show that a number of economic and organizational levers must be placed into action in behalf of national economic effectiveness. This is what we are oriented toward by the CPSU Central Committee's draft report to the 26th CPSU Congress.

11004
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FUELS

OFFSHORE DRILLING RIG RESCUED FROM STORM

Moscow IZVESTIYA in Russian 20 Feb 81 p 6

[Article by A. Pushkar': "Courage"]

[Text] As we know, a group of workers of "Sakhalinmorneftezprom" led by the association's chief, 26th CPSU Congress delegate I. Sidorenko, was awarded USSR orders and medals for its selfless actions in rescuing the "Okha" floating drilling rig. The documents of this unprecedented operation and the stories told by the people who did what seemed to be the impossible recreate the picture of what happened in the wide-open spaces of one of the planet's cruelest seas--Okhotsk.

All who were on the platform will never forget that unusually clear day. The sun was shining and the water was peacefully blue, as if to order. All of the conditions were right for the "Okha", which had just slid off the building dock, brand new and shining with a fresh coat of paint, its machine units and control consoles pleasing the eyes. And when Captain G. Milyutin, who was observing the birth of the "Okha" from the dock said with a quavering voice: "Raise the state flag of the Union of Soviet Socialist Republic", when the anthem was sounded and the red flag began flapping overhead, everyone's spirits soared.

The "Okha" was the first drilling rig acquired by our country for work on the Far East shelf. Before its appearance, work could go on for only 3 or 4 months out of the year due to the especially complex hydrometeorological conditions. The "Okha" stretched these limits further. Bold plans for the 11th Five-Year Plan are associated with it. "Getting on their mark," as offshore drillers say, they quickly drilled a well from the "Okha", within a month. The oil began to flow and, as is done during tests, the escaping gas was ignited. This was a holiday: They had not worked for nothing. But the time of storms and ice was approaching. The rig had to be dismantled and prepared to wait out the winter.

When the hundred-meter "legs" are raised, the dependable steel island transforms into a towable vessel, and becomes susceptible to all of the vagaries of the sea. According to studies made by Noble Denton, an insurance company consultant, 55 drilling rigs have suffered mishaps while being towed since 1955. The North Sea disaster suffered by the platform "A. Kelland", which served as a floating hotel, is still fresh in our memories: One of the supporting columns was broken apart by a severe storm, the platform collapsed, and more than 100 persons perished.

This is why preparations for the passage were started a month ahead of time. Following the experience of towing operations abroad, a special plan was written up for the passage, the charts and navigational directions applicable to the regions through which the course lay were studied, and places to ride out possible storms were noted. Weather data covering a 10-year period were analyzed, and a long-term forecast was made. The equipment was packed into traveling configuration, all hatches were carefully closed, and ventilation openings were plugged. The "Okha", which carries a price tag of tens of millions of dollars, was secured. And now the last helicopter left. The platform was lowered to the water.

"We are now under tow. We are on course. Winds are from the west, 6 meters per second, and the sea state is 1 point. Everything is in order aboard the drilling rig and tugs," the rig radioed its messages to Yuzhno-Sakhalinsk, to the expeditionary office of "Dal'mornefterazvedka". Yes, the weather was fabulous. "It was as smooth as silk," seamen later recalled. But reports of danger were already being transmitted from the shore to the southward-steaming caravan. An unforeseen danger, alas.

"Storm warning. An easterly, southeasterly strong storm wind is anticipated, 25-30 meters per second. Wave height--4-6 meters."

And a few hours later:

"The winds are at 29-30 meters per second, violent storm."

All who were not on duty went on deck to secure the supports again and again, to spin a cocoon of cables around the diving bell, and to weld the hatch covers down. Radio messages were transmitted from the "Okha" to the expeditionary office every 4 hours:

"Course steady, winds 20-25 meters, wave height 4-5 meters. The day's traveling distance was 46 nautical miles."

It was at this time that it all began.

Huge waves rolled over the platform, which was only 3 meters above the water. The winds howled, metal clanged against metal somewhere, and the rig, rocked by the waves, creaked from the strain.

All navigators convened in the wheelhouse. Captain G. Milyutin was aboard the tug. E. Samchenko was the acting captain. What did they know about him back at the expeditionary office? Even when home, he would not part with the sea: He enjoyed sailing, he organized a yacht club, and he taught young boys to not be afraid of the water. Next to him in the wheelhouse was an experienced seaman with 30 years service, A. Lozovskiy, and Chief Mate V. Chapayev, who had spent 20 years of his life at sea.

The winds grew more intense. It became clear from the weather charts that two cyclones which were traveling head-on and which should have cancelled each other out instead combined and struck the caravan with doubled energy. The wind force indicator would at times jump above 30, 40, and out of the range of the meter.

Screens in the wheelhouse showed what was seen by television cameras viewing places that could not be seen from the bridge. The screen revealed barrels that had been secured by cables suddenly breaking away and rolling around the platform. Then oxygen tank storage crates welded to the deck broke away. They crushed everything in their paths, breaking the wing nuts off of the hatch covers.

Alarming messages were transmitted to the bridge one after another. Samchenko selected the most critical problems and sent groups out to correct them. The first efforts were directed at the helicopter pad which, even though it towered 10 meters above the sea, did sometimes touch water. Some boards had gotten loose there, and Boatswain F. Dekhtyar, Seaman S. Korytkin, and other sailors, drenched with water, resecured them.

The worst began at midnight. A 20-point storm unleashed its fury upon the caravan. They could see from the wheelhouse that from time to time the helicopter pad dipped into the water. And every time it touched the water, the entire hull responded with a shudder. Milyutin and Samchenko decided to fill the aft tanks with water in order to raise the bow. But this did not improve the situation. They anxiously watched the howling night.

And suddenly, before the eyes of the astounded navigators, the 40-ton helicopter pad touched the water and hovered over the sea like a sheet of tin. Then, vibrating, it remained suspended for several minutes, and then collapsed. The navigators immediately noticed how quickly the lights of the tug began moving away. They realized that the steel cable, which had a diameter the size of a fist, had been cut. Together with the tug, the propellers of which became visible from time to time in the troughs between waves, the rig drifted in the direction of the shore. And now its "legs"--its support in working configuration--acted literally as giant sails. Responding as a sailboat, the "Okha" rushed toward its death--toward the cliffs.

"Turn on the towing winch" Samchenko shouted to the mechanics. This meant that he had decided to try to reattach the tow line.

Another message came in: Water was getting into the hold through the cover of the main hatch. It had to be secured immediately; otherwise the platform would take on lethal cargo. It was impossible to do this from the outside; it had to be done from inside. V. Smolyakov, a young communist, would not think of his own safety at this moment.

"There was no time for that," he said. "We were fighting to do what we could to save the rig, with no time left to think about the danger."

It began getting light. And suddenly a black barrier of cliffs, a snow-covered mountain range, appeared out of the fog. They were right next to shore. It was just half a mile away. The echo sounders indicated that the depth was decreasing with every minute. The tug would not be able to pass between the platform and the shore without the risk of running aground.

At this very minute a light was already burning in a squat wooden house on the outskirts of Yuzhno-Sakhalinsk, and in the crowded little room of Dal'mornefterazvedka's radio station stood I. Sidorenko and other specialists of the hastily created

"Okha" rescue staff. In this dramatic situation our seamen made the only correct decision. In order to keep the rig from being tossed on shore, Milyutin ordered his crew to pump a thousand and a half tons of water into the ballast tanks as a way to make the platform heavier and slow its swift movement toward danger.

The fight for the rig's life went on for 2 days without a minute's rest. Drenched to the skin, for 2 days the people would not rest. And when Samchenko's voice broke out over the broadcasting system: "Stop all work. Abandon the rig," it was hard to believe that this was not a training exercise this time, that it was the real thing. But there was no panic, shouting, or running. In the critical situation, the people did everything they were supposed to do.

Here are the last entries in the radio station's log book:

"0130 hours. Coordinates were set in the automatic disaster signal transmitter on Samchenko's orders.

"0200 hours. The order to abandon the rig was received from Captain Milyutin. Women took to the motorboat.

"Foreign specialists are now in the motorboat.

"0230 hours. There are 31 persons aboard the motorboat. All except me and the captain. I am shutting down. I am going for the motorboat."

And so all 33 persons made it aboard the tug. There were no casualties.

Although they had all been on their feet for 2 days, the excitement would not subside. One of the foreigners descended into the cabin to talk to our seamen.

"Can't sleep," he said. "When I get home I'll tell my family and children about this hurricane, and about the perseverance of your men."

Meanwhile the telephones at the main base of "Dal'mornefterazvadka" were ringing off the hooks. The expeditionary office had made the public aware of the emergency. As in wartime, volunteers asked to go to the front, to the "Okha". Everyone understood the seriousness of the situation. After all, fulfillment of the program of shelf exploration depended on the floating drilling rig.

It was later reckoned that 130 specialists from 9 ministries and departments, from the emergency rescue services of the Sakhalin and Far East steamship companies and "Dal'ryba", and two helicopters from the USSR Ministry of Civil Aviation, piloted by V. Dzyuba and V. Borisenko, took part in the "Okha's" rescue.

As soon as the weather began to quiet down, G. Milyutin and his crew were the first to be landed aboard the rig. They answered the most important question: The rig was still afloat, the hull had not been damaged, and the engine room and main control panel had not been flooded.

Now they began "resuscitating" the platform. The rescuers brought high-capacity pumps aboard to pump the water out. The icebreakers "Sedov" and "Litke" and other

vessels steamed close. Four tugs deployed two cables. Diver Yu. Vasil'yev established that the platform was sitting in an ancient river valley, and that two of its "legs" had stepped over a rocky ridge, such that the platform was essentially trapped. Then the diver swam along the bottom of the sea to determine how the "Okha" managed to trap itself, and thus he helped to solve the problem of how to extricate it.

This was the first case in world practice where a floating drilling rig managed to stay afloat under such conditions.

"To what do we owe this miracle?" I asked Sidorenko.

"Are you waiting for me to say that it was courage and self-sacrifice? Yes, that would be true," he answered. "But I would also name something else--order and discipline. A keen sense of responsibility...."

The dark-eyed, dry, self-controlled person standing before me was no longer young, but he was not graying either. On graduating from the Sverdlovsk Mining Institute and finding himself on the wind-swept northernmost tip of Sakhalin, Ivan Mikhaylovich broke himself gradually into his career. Beginning as a driller's apprentice, he learned through his own experience everything making up the highly complex and extremely difficult process of drilling.

The shelf.... The Far East offshore geological exploratory expedition was organized in 1976 for deep drilling; I. Sidorenko was given charge of it. (Recently he was appointed chief of the "Sakhalinmorneftegazprom" Association.) Our country had not yet acquired any experience in drilling wells on the continental shelf, and it did not have its own floating platforms. They had to be leased, which was expensive. And all of this requires an enormous amount of very expensive work. "Sakhalin-morneftegazprom" is making the preparations for the planning and construction of marine ice-proof stationary platforms. What should the characteristics of these artificial islands be? After all, the Sakhalin shelf is not the Caspian Sea.

My thoughts turn to the draft Basic Directions, to the work locations they specify in eastern regions and in the north, and I begin to understand how grandiose, how truly titanic the efforts will be on land and at sea. And no matter how much help we will get from computers and manipulators that multiply our strength tenfold, we will probably never exclude situations requiring the greatest exertion of man's physical and spiritual forces, as was the situation on the "Okha". It will begin drilling in summer, as planned.

11004
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GAS FIELD DISCOVERED BY CASPIAN SEA

Moscow EKONOMICHESKAYA GAZETA in Russian No 13, Mar 81 p 14

[Article by Correspondent D. Koreshkov, USSR Ministry of Geology Press Center: "A Well at Karachaganak"]

[Text] According to the predictions, the north rim of the Caspian Sea has long promised combustible minerals. But only at very substantial depths--5 to 7 kilometers.

Here, in Ural'skaya Oblast, geological explorers began deep drilling for oil and gas several years ago. But prior to 1979, there were no signs adequately proving the existence of petroleum and gas in the ground.

Prospecting is difficult because the crude hydrocarbons lie in so-called subsalt Paleozoic deposits--lower Permian, Carboniferous, and Devonian. And not as continuous accumulations but rather in unique "traps", in several "stories". The readings of the geophysical instruments would not say precisely where the deposits were, how many layers they consisted of, and the specific structural formations in which they lay. Nature had clearly "tried too hard" in this area, having created an extremely complex geological picture. It became understandable only with the help of deep drilling.

S. Kamalov, chief of the Ural'sk oil prospecting expedition of the "Kazneftegazgeologiya" Association, drew curves of complex shape on a piece of paper. Gradually the boundaries of the fields took shape.

"The first to be successful was the team led by drilling foreman S. Lapshin," he said. "It took almost a year to drill the well. It is four and half kilometers deep. Gas began to flow out of the traps, which were located one above the other, after the shaft dropped to 3.7 kilometers. True, the gas flow was weak. The reason for this was found later on: The well passed along the edge of the pockets in which the accumulations of the valuable raw material were the greatest. But even the weak flow was quite enough to permit correct assessment of future prospecting efforts.

Well No P-10 (the 10th parametric well) was drilled somewhat later near the town of Karachaganak. Foreman S. Lapshin managed the drilling cautiously, attentively watching for changes in the physical and chemical properties of the rock. He very much wanted to obtain dependable proof of the bold geological predictions.

And they were confirmed. Gas condensate began to appear with a depth of 3.9 kilometers. The drillers dug another 500 meters into the ground. The gas condensate continued to flow. It could be doubted no longer: A new, very large deposit had been discovered. The "trap", which was 500 meters thick, and which possibly had a length and breadth of dozens of kilometers, contained a tremendous quantity of "blue fuel".

A decision was made to let the well "breath deeply". A bypass was made from the main shaft, the gas was allowed access to the outside, and then it was ignited. The resulting thunderous roar was equivalent to the noise produced by several jet aircraft. Driller A. Bozhko, who had spent more than 20 years of his life searching for gas and oil fields, said it all briefly and clearly: It's not a well--it's a figment of the imagination!"

But this "figment of the imagination" was real. After studies were performed, demonstrating that the well's productivity would be very high (more than 700,000 cubic meters of gas per day), the gusher was capped. Well P-10 became a producing well at the beginning of the present year, the first in the new field. And the new field has been named "Karachaganakskaya".

Meanwhile S. Lapshin's and A. Kas'yanov's teams are finishing the drilling of the third and fourth well. Both their fate and significance will be the same: They will soon be turned over to the producers.

There is still much to do. The boundaries of the new deposit will have to be determined precisely--its limits will have to be described, and the amount of raw material it contains will have to be determined more specifically. The geological exploratory wells are being drilled one after another. All 11 drilling teams of the expedition are laboring in high spirits. The drilling norm per rig is 305 meters per month, while the actual rate is averaging 390 meters.

First Deputy Minister of Petroleum Industry V. I. Igrevskiy said: "The successes of the Kazakhstan explorers are great. Karachaganak is a real discovery. I am persuaded that geologists will encounter more deposits deep in the Caspian subsoil."

Doctor of Mineralogical Sciences I. P. Zhabrev, chief of the Geological Administration of the Ministry of Gas Industry, ventures the following opinion:

"It seems that we have already gotten used to associating geological discoveries with places that are poorly developed in economic respects--the taiga and tundra of Siberia and the Far North. Now we find that impressive underground treasures can also be encountered in rather well inhabited regions. Gas condensate coming up from the Caspian subsoil contains many valuable components. As a geologist, I have faith in the new deposit's great future."

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